UNIVERSITY OF WYOMING

AGRICULTURAL EXPERIMENT STATION

LARAMIE, WYOMING

BULLETIN NO. 109

NOVEMBER 1915

SHEEP FEEDING

I. (a) Oat and Pea Silage for Fattening Lambs.
(b) Corn vs. Barley for Fattening Lambs.

II. Oat and Pea Silage for Breeding Ewes.

III. Oat and Pea Silage for Ram Lambs.

A. D. Faville

Bulletins will be sent free upon request. Address: Director Experiment Station, Laramie, Wyoming.

Digest.

The heaviest gains made by fattening lambs were on a rations of corn and alfalfa. Page 52.

Valuing alfalfa at $12.00 and silage at $4.00 per ton, a ration in which silage was used made as cheap gains in fattening lambs as did the corn and alfalfa ration. Page 52.

Alfalfa and silage without grain did not prove to be a satisfactory fattening rations for lambs. Pages 52-53.

When barley replaced corn in a fattening ration gains were somewhat lower. Page 54.

Oat and pea silage may be used satisfactorily in rations for breeding ewes. Page 56.

In growing rations for ram lambs oat and pea silage may be used to replace part of the alfalfa. Page 57.

UNIVERSITY OF WYOMING

Agricultural Experiment Station

LARAMIE

BOARD OF TRUSTEES

Officers.

TIMOTHY F. BURKE, LL. B. ..... President
C. D. SPALDING ..... Treasurer
FRANK SUMNER BURRAGE, B. A. ..... Secretary

Executive Committee.

A. B. HAMILTON T. F. BURKE W. S. INGHAM

Members.

Appointed		Term Expires
1911	HON. ALEXANDER B. HAMILTON, M. D.	1917
1911	HON. LYMAN H. BROOKS	1917
1913	HON. CHARLES S. BEACH	1917
1895	HON. TIMOTHY F. BURKE, LL. B.	1919
1913	HON. MARY B. DAVID	1919
1914	HON. MARY N. BROOKS	1919
1911	HON. W. S. INGHAM, B. A.	1921
1913	HON. C. D. SPALDING	1921
1915	HON. J. M. CAREY	1921
EDITH K. O. CLARK, State Superintendent of Public Instruction		Ex Officio
PRESIDENT C. A. DUNIWAY, Ph. D., L. L. D.		Ex Officio

STATION COUNCIL

C. A. DUNIWAY, Ph. D. ..... President
HENRY G. KNIGHT, A. M. * ..... Director and Agricultural Chemist
F. S. BURRAGE, B. A. ..... Secretary
C. D. MOIR ..... Clerk

A. NELSON, Ph. D. ..... Botanist and Horticulturist
F. E. HEPNER, M. S. ..... Assistant Chemist
J. A. HILL, B. S. ..... Wool Specialist
O. L. PREIN, M. D. V. * ..... Veterinarian
J. C. FITTERER, M. S., C. E. ..... Irrigation Engineer
A. D. FAVILLE, M. S. ..... Animal Husbandman
T. S. PARSONS, M. S. ..... Agronomist
S. K. LOY, Ph. D. ..... Chemist
KARL STEIK, M. A. ..... Engineering Chemist
J. W. SCOTT, Ph. D. ..... Parasitologist
J. E. McWILLIAMS, B.S. * ..... Animal Husbandman
O. A. BEATH, M. A. ..... Research Chemist
P. T. MEYERS, B. S. A. ..... Assistant Agronomist
J. I. KIRKPATRICK, D. V. M. ..... Veterinarian

* Absent on leave.

Sheep Feeding Experiment.

INTRODUCTION.

The great silage crop, corn, is grown successfully in few parts of Wyoming. Have we other materials that may be used to advantage in furnishing succulence for our winter stock rations? If satisfactory corn substitutes are found, many parts of the state will find the silo a paying proposition. Experiments outlined on the following pages were undertaken with the idea of throwing some light on the Wyoming silo problem.

Sheep.

The lambs fattened experimentally were ordinary range stuff out of grade fine wooled ewes which had been bred to mutton rams. Altho fairly uniform in type, they were not choice in quality. The breeding ewes consisted of the College purebred flock, a mixture of both Down and Long-wooled breeds. They were in good condition, hence required no more than a maintenance ration. The ram lambs were purebreds from the College flock and represented most of the leading mutton breeds. All lots compared were arranged so as to indicate animals of the same type and breeding.

Shelter.

Good shelter was provided for all lots. The fattening lambs had yards large enough to furnish needed exercise while the ewes and rams had the run of large fields during the pleasant days. All of the sheep were housed in a dry well-vetilated barn.

Divisions Made and Rations Fed.

Divisions were always planned with the idea of making lots to be compared as uniform as possible. The number of animals in each lot and rations fed were as follows:

Lot I. (25 lambs). Shelled corn, alfalfa, silage.

Lot II. (25 lambs). Shelled corn, alfalfa.

Lot III. (25 lambs). Whole barley, alfalfa, silage.

Lot IV. (25 lambs). Alfalfa, silage.

Lot V. (20 breeding ewes, 1 ram). Alfalfa.

Lot VI. (20 breeding ewes, 1 ram). Alfalfa, silage.

Lot VII. (12 rams). Grain (5 parts mill feed, 2 parts oats, 3 parts corn meal), alfalfa, silage.

Lot VIII. (11 rams). Grain (same as Lot VII), alfalfa.

Feeds.

Corn was shipped in from Nebraska. Scotch barley grown on the Laramie Plains was fed. The alfalfa, both first and second cutting, was of good quality and was grown on farms near the Station. During the latter part of the tests with breeding ewes and ram lambs, alfalfa brought in from Wheatland was fed. It was poor in quality and very coarse. The mill feed, or mill run bran, consisting of a mixture of bran and middlings, was an Idaho product. The oats were also from outside of the state. Oats, through which were scattered a few peas, furnished the bulk of the silage. The crop was harvested when the oats were beginning to turn and a consid-

erable amount of water was added to the silage material. Small amounts of barley and alfalfa, which were also ensiled, came out in good shape. The bulk of the silage fed experimentally consisted of the oats and peas. It kept well and was greedily eaten by cattle of all ages. The sheep were somewhat slow in taking to the silage and it was seldom possible to get them to eat more than a pound a day, even when fed morning and evening.

An analysis of all the feeds used will be found at the back of this bulletin.

During extremely cold weather fresh water was supplied to each lot twice a day; at other times the tubs were filled oftener. Salt was always accessible.

Weight.

Lots I to IV, inclusive, were weighed for three successive days at the beginning and end of the trial and averages of the weights were taken. Single weighings were made every two weeks during the tests. Lots V, VI, VII and VIII were weighed every four weeks.

Methods of Feeding.

All feed troughs and racks were under cover. Hay was placed in long V-shaped racks built so as to catch hay that was pulled out. Silage and grains were fed in narrow troughs. The fattening lambs were given all their feed in morning and evening installments. Lot V had hay morning and evening and Lot VI received silage in the morning and hay in the evening. Lot VII

received grain and alfalfa in the evening and silage in the morning, while Lot VIII had grain in the evening and alfalfa in the morning and evening. The preliminary feed of lots to be compared was always the same. The sheep were in charge of R. P. Allen, who gave them careful attention throughout the trial.

Prices of Lambs and Feeds.

The grade lambs were purchased for $5.50 per hundred and sold locally for $6.25. Had there been enough to ship the price realized would probably have been somewhat better. Feeds have been figured at the following prices: Corn and barley, $1.25 per hundred; alfalfa, $12.00 per ton, and silage, $4.00 per ton.

I. (a) OAT AND PEA SILAGE FOR FATTENING LAMBS.

As was previously stated, the silage consisted chiefly of oats. The lambs were fed all the silage and hay they would clean up with a limited grain ration. By restricting the grain allowance it was thought that the lambs might be induced to eat more silage. Table I shows the comparative value of the various rations:

TABLE I.

Oat and pea silage for fattening lambs.
Nov. 18, 1913, to Mar. 10, 1914. (112 days).

	LOT I.	LOT II.	LOT IV.
	Corn, alfalfa, silage.	Corn, alfalfa.	Alfalfa, silage.
	lbs.	*lbs.*	*lbs.*
Avg. initial weight	46	46.1	45.7
Avg. final weight	73.8	76.2	64.6
Gain per lamb	27.8	30.1	18.9
Avg. daily gain	.25	.27	.17
Avg. daily feed per lamb:			
Grain	.47	.47	
Alfalfa	1.8	2.3	2.3
Silage	.7		.74
Feed per 100 lbs. gain:			
Grain	191	176	
Alfalfa	730	854	1376
Silage	284		439
Cost of 100 lbs. gain	$7.33	$7.32	$9.13

Lot II receiving corn and alfalfa made slightly the best gains while Lot IV, getting no grain, was a poor third. Comparing Lots I and II we find that .7 pounds of silage in one ration replaced .5 pounds of alfalfa hay in the other. Lot IV received the same hay ration as Lot II and .74 pounds of silage was fed instead of .47 pounds shelled corn. The grainless ration did not put on satisfactory gains.

Feed requirements for 100 pounds gain were fairly low with Lots I and II while with Lot IV they ran high, due to the slow gains made. Lot I in comparison with Lot II required 15 pounds more grain and 124 pounds less hay

in addition to 284 pounds of silage to make a hundred pound gain.

Using feed prices indicated previously we find cost of gains practically the same for Lots I and II and much higher for Lot IV. Under conditions outlined for the first two lots, with alfalfa at $12.00 per ton, the silage was worth $4.00. It is possible better silage returns would have been obtained if the lambs had eaten it more freely.

At the close of the 112 day feeding period, Lot IV lacked finish so was put on a grain ration for 28 days. The following figures were collected during this time:

Lot IV, on feed 28 days, Mar. 11 to Apr. 7, 1914.

	Lbs.
Average initial weight	64.6
Average final weight	72.1
Average total gain	7.5
Average daily gain	.27
Average daily rations:	
Shelled corn	6
Alfalfa	2.0
Silage	1.0
Feed for 100 lbs. gain:	
Grain	219
Alfalfa	755
Silage	373

While gains were much better than they had been previously financial returns did not justify the added expense.

(b) CORN VS. BARLEY FOR FATTENING LAMBS.

Barley is a grain that can be grown successfully in most of our western country while the areas adapted to corn culture are extremely limited. Home grown rations are to be desired when practicable, hence compari-

sons between corn and barley are always interesting to feeders outside of the corn belt. Lots I and II furnish comparisons between two rations, one of which was composed entirely of home grown feeds while the other had native roughages with corn as a concentrate. Table II furnishes a comparison of the two rations.

TABLE II.

Corn, alfalfa and silage vs. barley, alfalfa and silage for fattening lambs.

Nov. 18, 1913, to Mar. 10, 1914. (112 days).

	LOT I. Corn, alfalfa, silage.	LOT III. Barley, alfalfa, silage.
Avg. initial weight	46 lbs.	46.3 lbs.
Avg. final weight	73.8 lbs.	71.6 lbs.
Gain per lamb	27.8 lbs.	25.3 lbs.
Avg. daily gain	.25 lbs.	.23 lbs.
Avg. daily feed per lamb:		
Grain	.47 lbs.	.47 lbs.
Alfalfa	1.8 lbs.	1.8 lbs.
Silage	.7 lbs.	.7 lbs.
Feed for 100 lbs. gain:		
Grain	191 lbs.	209 lbs.
Alfalfa	730 lbs.	802 lbs.
Silage	284 lbs.	312 lbs.
Cost of 100 lbs. gain	$7.32	$8.04

Returns from corn were somewhat better throughout the experiment, though differences were not great. Eighteen pounds less grain, 72 pounds less alfalfa and 28 pounds less silage was required for 100 pounds gain when corn replaced barley in the ration and the cost of 100 pounds gain was 72c less with Lot I than with Lot III. Under conditions prevailing in many sections of the state, either ration ought to put on profitable gains.

Part II. OAT AND PEA SILAGE FOR BREEDING EWES.

The sheepman who is compelled to feed his stock throughout the winter or during periods of storm is always interested in the question of maintenance rations for his breeding ewes. A ration to be satisfactory must be one that puts the animal in good breeding condition without putting too heavy a drain on the owner's pocketbook. Succulent feeds are always desirable for breeding stock. Roots or corn silage are used extensively in sections where either crop may be satisfactorily grown. Western rations have usually lacked in succulence. Can this deficiency be met by ensiling crops that thrive where corn cannot be grown and roots are produced at a high cost? A study of Table III may throw some light on the subject.

Lots V and VI, composed of the University breeding ewes, were fed with the idea of comparing a straight alfalfa ration with one in which oat and pea silage replaced part of the alfalfa.

TABLE III.

Alfalfa vs. alfalfa and silage for breedings ewes.
Jan. 3, to Feb. 28, 1914. (56 days).

	LOT V.	LOT VI.
	Alfalfa.	Alfalfa, silage.
Avg. initial weight	185 lbs.	183 lbs.
Avg. final weight	193 lbs.	186 lbs.
Gain per sheep	8 lbs.	3 lbs.
Avg. daily ration:		
Alfalfa	4.5 lbs.	3 lbs.
Silage		1.5 lbs.
Cost per week of keeping one 185 lb. ewe	18.9c	14.7c

Both rations proved to be satisfactory for maintenance requirements. Lot V gained a trifle more but that is to be expected. With Lot VI silage replaced alfalfa pound for pound, hence the total dry matter fed this lot was considerably less. There was apparently no difference in the strength and quality of the lambs dropped by the two lots, the percentage of lambs being unusually high for the whole flock.

At the feed prices established, $12.00 per ton for alfalfa and $4.00 for silage, the cost of feed per week for each animal in Lot V was 18.9c. With the animals in Lot VI getting silage this charge was reduced to 14.7c per head, a saving of 4.2c per week. From the standpoint of economy, with feed priced as indicated, the silage rations proved to be the more satisfactory.

PART III. OAT AND PEA SILAGE FOR RAM LAMBS.

Twenty-three purebred lambs dropped rather late in the spring of 1913 were divided as carefully as possible into two lots and put on growing rations planned to still further test the value of the oat and pea silage previously described.

Table IV gives the chief points of interest brought out in connection with this test.

TABLE IV.

Grain, alfalfa and silage vs. grain and alfalfa for growing rams.

Jan. 3, to Apr. 11, 1914. (98 days).

	LOT VII.	LOT VIII.
	Grain, alfalfa, silage.	Grain, alfalfa.
Avg. initial weight	88.5 lbs.	88 lbs.
Avg. final weight	112.5 lbs.	118.9 lbs.
Gain per lamb	24 lbs.	30.9 lbs.
Avg. daily gain	.24 lbs.	.32 lbs.
Avg. daily feed:		
Grain	.6 lbs.	.6 lbs.
Alfalfa	3 lbs.	4.4 lbs.
Silage	1 lbs.	
Feed for 100 lbs. gain:		
Grain	248 lbs.	193 lbs.
Alfalfa	1221 lbs.	1405 lbs.
Silage	408 lbs.	
Cost of 100 lbs. gain	$11.24	$10.84
Cost of growing rations per ram per week	19.2c	23.7c

The ration fed Lot VII was the cheaper but gains were smaller. The cost of putting on 100 pounds gain was 40 cents cheaper with Lot VIII than it was with Lot VII.

In all cost figures we must not lose sight of the fact that feed prices used probably vary widely from prices prevailing in many parts of the state and re-adjustments must be made to meet local conditions.

The amount of alfalfa fed Lot VII was restricted in an attempt to make the sheep eat more silage, yet it seemed impossible to get them to take large amounts. For this reason the ration supplied Lot VII was consid-

erably lower in feeding value than that given Lot VIII.

Summing up the results obtained from the use of silage in sheep rations during the past year one would not be far wrong in giving it a value of $4.00 per ton when first class alfalfa is worth $12.00. With a larger percentage of peas in the silage its value ought to be correspondingly increased.

ACKNOWLEDGEMENT.

The writer is indebted to Mr. E. N. Roberts, Assistsant Station Chemist, for analyses of the feeds used in these experiments. The results he obtained are given in Table V.

TABLE V.

Percentage composition of feeds used.

FEED.	Water	Ash	Crude protein	Crude fiber	Nitrogen free ext.	Ether extract
Alfalfa	6.14	7.20	11.00	37.33	36.89	1.44
Oat and pea silage	6.21	8.09	9.65	27.05	44.95	4.05
Oat and pea silage, (calculated to original water content)	69.73	2.61	3.11	8.73	14.51	1.31
Corn (whole)	8.81	1.33	9.81	2.01	74.24	3.80
Corn meal	8.66	1.69	10.44	2.05	73.43	3.73
Barley	8.51	3.36	12.40	6.80	66.69	2.24
Oats	7.90	3.64	13.38	10.53	59.85	4.70
**Mill feed	8.30	5.67	15.45	8.09	57.65	4.84

**Called also mill run bran, a mixture of bran and middlings.