

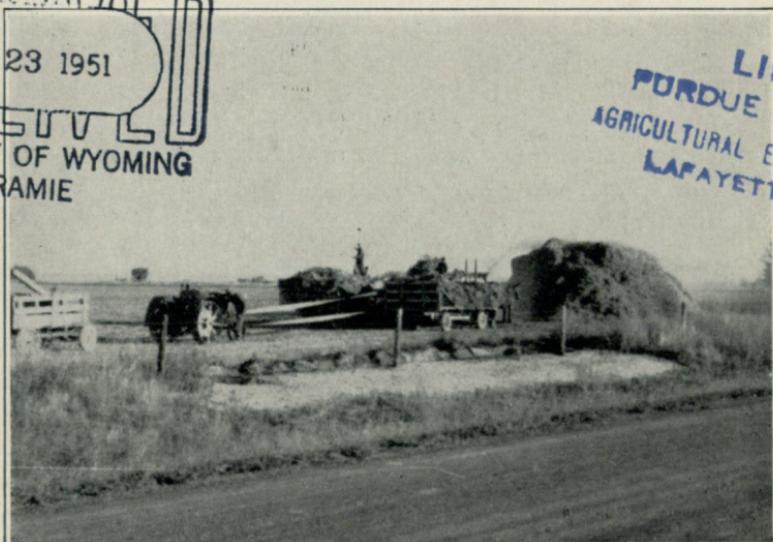
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Threshing Beans in the Big Horn Basin

Bean Straw in the Ration for Fattening  
Lambs in the Big Horn Basin

JUN 14 1941

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# Bean Straw in the Ration for Fattening Lambs in the Big Horn Basin

BY ALDEN S. INGRAHAM\*

## INTRODUCTION

The five northwestern counties of Wyoming which comprise the watershed of the Big Horn River harvested in 1937 45,500 acres of beans. The production from this acreage was 52,510,000 pounds of dried beans<sup>1</sup>. This represented 77 per cent of all the bean acreage in Wyoming, and about 81 per cent of all the beans produced in the state. From the above figures it is estimated that there were approximately 26,000 tons of bean straw available in this district for the feeding of livestock.

Little experimental work has been done with bean straw to determine either its value, or the best methods of utilization.

In the Big Horn Basin bean straw has usually been used for wintering livestock and to a limited extent in fattening rations in various districts. A considerable amount of this feed has not been used with any degree of efficiency due to the fact that there has been a lack of information concerning its value and method of use. In years of scarcity of alfalfa hay and in those districts where alfalfa is grown only in limited acreages and in other districts, when the crop is short, bean straw has customarily been sold for about one-third to one-half of the price of alfalfa. In years of large hay supplies a considerable amount of bean straw does not find a suitable market.

In an effort to determine the comparative value of bean straw and alfalfa when used for fattening lambs, the Department of State Experiment Farms began a period of lamb feeding tests at the Wyoming Industrial Institute, which is located in Washakie County six miles south of Worland. The work was begun in the fall of 1932 and has been carried on in cooperation with the State Board of Charities and Reform. The results set forth in the following pages cover three years.

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\*Mr. Ingraham was superintendent of the State Experiment Farm at Worland from May 1, 1932 until March 15, 1938.

<sup>1</sup>Wyoming Agricultural Statistics, 1937.



Three-Fourths of Wyoming's Bean Acreage is in the Big Horn Basin.

## RATIONS

The specific objects of the experiment were:

1. To determine the value of bean straw in comparison with alfalfa hay when used in a fattening ration for lambs in the dry lot.
2. To determine the value of other roughages when fed with bean straw in the dry lot ration.

Due to the fact that by far the largest proportion of bean straw is grown in districts located too far from sugar factories to use wet beet pulp, dried beet pulp was used in these rations. The following rations were fed:

Lot 7—Alfalfa hay, barley, dried beet pulp, and salt.

Lot 8—Alfalfa hay, bean straw, dried beet pulp, barley, and salt.

Lot 9—Bean straw, barley, dried beet pulp, and salt.

Lot 10—Bean straw, cured beet tops, barley, dried beet pulp, and salt.

### EQUIPMENT

Each lot of forty western range lambs was fed in a pen 50 by 50 feet in size. Hay was fed through three 14-foot panels arranged so as to make a "U" shaped feeding inlet in each pen. Where two roughages were fed, a second inlet was provided. Barley and dried beet pulp were mixed together and fed in reversible grain troughs, one foot wide and fourteen feet long. Two of these troughs were provided for each pen.

Hydrant water was supplied in 12-foot troughs which were built so that one trough served two pens. Wagon scales were used to weigh the hay, bean straw, and cured beet tops. The barley, dried beet pulp and salt were weighed on a portable platform scale.

### LAMBS USED

Lambs used in this experiment were good quality western range lambs of both sexes. During the first and third years, the lambs were of Rambouillet—Hampshire breeding. The second year they were typical western Rambouillets. A few of the lambs were affected with sore mouth (stomatitis) during the early part of the first year's trial. These recovered within a short time and thereafter made normal progress.

### FEEDS USED

Feeds were all locally grown with the exception of the dried molasses beet pulp which was shipped from the beet sugar factories at Sheridan, Wyoming, and Billings, Montana. The barley was of good quality, typical of that generally produced under irrigation in the inter-mountain region. It was of bright color, but had not been recleaned, and so contained some chaff and weed seed. The variety used, for the most part, was Trebi.

The alfalfa hay, for the most part, consisted of the second and third cuttings. Although both green and slightly brown alfalfa was fed, it was all of fairly good quality. All lots were fed the same kind of alfalfa at the same time.

Beet tops were produced on the farm of the Wyoming Industrial Institute and were allowed to cure partly in the field before piling by hand. These tops were hauled to the feed lots as needed.

Bean straw was not of uniform quality. Some Great Northern bean straw was used, as well as some from the fields of seed beans. Most of the seed bean straw was from the Giant Stringless variety. The Great Northern bean straw was reasonably free of beans, while the Giant Stringless seed bean variety contained a considerable number of broken pods from which the beans had not been separated. All of the lamb lots were treated alike with respect to the type of bean straw fed.

Plain block salt was always available in all lots.

### FEED PRICES

The feed prices used in this bulletin do not represent the actual prices paid in any one year but are approximate average prices of the feeds used during the three-year period. Feed costs are used merely to give a basis of comparison of returns received from the bean straw under the various methods of feeding.

#### *Feed Prices Used.*

Alfalfa—\$8.00 per ton.

Bean Straw—\$4.00 per ton.

Barley—\$20.00 per ton.

Dried Beet Pulp—\$20.00 per ton.

Cured Beet Tops—46 cents per ton of harvested beets.

Salt—\$27.00 per ton.

### METHOD OF FEEDING

At the beginning of the experiment all roughages were fed in the mornings and in the evenings in amounts that the lambs would readily clean up. It soon became apparent, however, that where bean straw and alfalfa were fed at the same time the lambs would leave the alfalfa for the bean straw. This resulted in a larger consumption of bean straw than of alfalfa. As soon as this was apparent, the bean straw was fed in the morning and the alfalfa in the evening. Cured beet tops were fed twice daily in Lot 10 and alfalfa was fed the same way in Lot 7. Any refused roughage was weighed back once a week.

Dried molasses beet pulp was mixed with barley before feeding. This mixture at the beginning of the experiment consisted

of equal parts of dried pulp and barley. As the experiment progressed, it was gradually changed to two parts of barley to one of pulp.

#### BEAN STRAW COMPARED WITH ALFALFA

Table I shows a comparison of bean straw and alfalfa, with bean straw the sole roughage in Lot 9 and alfalfa the only roughage in Lot 7. In Lot 8, the roughage consisted of bean straw and alfalfa, fifty per cent of each.

Very satisfactory gains were made in Lot 7 where alfalfa was the sole roughage. The gain in this lot was .27 pounds per lamb per day. In Lot 9, however, where bean straw was the sole roughage, the average daily gain was .21 pounds per lamb. The lambs in Lot 9 were far from a marketable condition at the close of 100 days of feeding, while the lambs in Lot 7 were for the most part of market weight and quality. The feed cost of the gains in Lot 9 where bean straw was the sole roughage were 36 cents per hundred pounds greater than where alfalfa was fed. The rate of gain was low in Lot 9 and larger amounts of barley and dried beet pulp were required for each unit of gain compared to Lot 7.

It was impossible to feed the customary amounts of concentrates in the lots where bean straw was the sole roughage. As soon as the grain ration per lamb reached about three-quarters of a pound per day the lambs in this lot began to scour. During the first year of the experiment the scouring of the lambs became so severe that it was necessary to substitute alfalfa hay for part of the bean straw in this lot in order to keep the lambs thrifty. During the last two years the scouring was prevented by keeping the grain ration at a point just below where scouring began, and by feeding the bean straw in limited quantities.

The use of bean straw in this experiment was entirely unsatisfactory both from the standpoint of the rate and cost of gains. Furthermore, it was necessary either to feed some alfalfa or to keep the grain ration at a low level in order to maintain the lambs in a thrifty condition.

TABLE I  
BEAN STRAW COMPARED TO ALFALFA  
Three-Year Average

Lot Number (40 head per lot) . .	7	8	9
Rations . . . . .	Alfalfa Barley Dried Pulp	Alfalfa Bean Straw Barley Dried Pulp	Bean Straw Barley Dried Pulp
Ave. No. Dead Lambs Per Year	1	1	0

## Average Daily Ration

Alfalfa . . . . .	1.977	1.144	.204*
Bean Straw . . . . .		1.512	2.210
Barley . . . . .	.677	.675	.583
Dried Beet Pulp . . . . .	.449	.444	.381
Salt . . . . .	.005	.003	.007

## Weights and Gains

Average Initial Weight . . . . .	61.736	61.796	60.836
Average Final Weight . . . . .	89.540	89.807	81.202
Average Daily Gain . . . . .	.274	.280	.203

## Pounds Feed Used Per 100 Pounds Gain

Alfalfa . . . . .	721.584	408.519	100.461*
Bean Straw . . . . .		540.170	1088.508
Barley . . . . .	246.927	240.908	287.048
Dried Beet Pulp . . . . .	163.835	158.648	187.903
Salt . . . . .	1.705	.937	3.627

\*Alfalfa was fed with the bean straw for part of the season 1932-33 to reduce scouring.

## SUBSTITUTION OF BEAN STRAW FOR ONE-HALF THE ALFALFA IN THE RATION

In Lot 8 where the roughage consisted of approximately one-half alfalfa and one-half bean straw the gains were comparable in every way to those where straight alfalfa was fed. The lambs in Lot 8 gained an average of .28 pounds per lamb per day as compared to .27 pounds per day in Lot 7 where alfalfa was the sole roughage. In this comparison one ton of bean straw had a replacement value of 1,158 pounds of alfalfa, 22 pounds of barley, and 19 pounds of dried beet pulp. The addition of the bean straw to the ration resulted in a net saving of 30 cents per hundred pounds of gain, based on feed prices previously mentioned.

## CURED BEET TOPS AS A ROUGHAGE SUPPLEMENT TO BEAN STRAW

By the end of the first year's feeding trial, it was apparent that bean straw should be supplemented with another roughage in order to use the straw more efficiently. In much of the territory where bean straw is available there is also available a large supply of beet tops. This suggested the possibility of substituting beet tops as a part of the roughage ration. In the feeding season of 1933-34, an additional lot was added to the experiment to study this possibility. In Table II is a comparison of Lot 10, where bean straw was supplemented with cured beet tops and Lot 9 where bean straw was fed as the sole roughage.

The addition of cured beet tops to the ration resulted in an increase in the daily gain from .21 pounds per lamb in Lot 9 to .23 pounds in Lot 10. In this experiment one ton of cured beet tops replaced 111 pounds of bean straw, 233 pounds of barley and 133 pounds of dried beet pulp. The addition of cured beet tops to the ration increased the rate of gain and decreased feed costs 14 cents per hundred pounds of gain.

While it is apparent that the addition of cured beet tops improved the ration, nevertheless gains obtained with cured beet tops and bean straw as the sole roughage were considerably below those obtained where part of the roughage consisted of alfalfa hay. It is evident that a greater return is obtained from the bean

straw where it is supplemented with alfalfa hay than where it is supplemented with beet tops.

TABLE II  
CURED BEET TOPS AS A SUPPLEMENT TO BEAN STRAW  
Two-Year Average

Lot Number (40 head per lot).....	9	10
Rations . . . . .	Bean Straw Barley Dried Pulp	Bean Straw Cured Beet Tops Barley Dried Pulp
Average Number Dead Lambs Per Year	0	1½

Average Daily Ration

Bean Straw . . . . .	1.943	2.049
Cured Beet Tops.....		1.256
Barley . . . . .	.713	.632
Dried Beet Pulp.....	.437	.394
Salt . . . . .	.011	.005

Weights and Gains

Average Initial Weight . . . . .	61.519	61.186
Average Final Weight . . . . .	82.718	85.290
Average Daily Gain . . . . .	.211	.230

Pounds Feed Used Per 100 Pounds Gain

Bean Straw . . . . .	920.731	890.758
Cured Beet Tops.....		546.030
Barley . . . . .	337.884	274.849
Dried Beet Pulp.....	207.110	171.210
Salt . . . . .	5.274	2.05

SUMMARY

1. Bean straw when fed as the sole roughage in a lamb fattening ration did not produce satisfactory gains. The lambs were inclined to eat so much bean straw that they scoured severely

and while this did not create a serious death loss, it decreased the rate of gains and gave the lambs a very unthrifty appearance.

2. When bean straw was used to replace one-half of the alfalfa in the ration, the straw had a replacement value equal to the alfalfa and resulted in somewhat larger daily gains. Apparently the lambs favored the bean straw over the alfalfa and if permitted to do so would eat almost exclusively of this roughage. Scouring resulted when the lambs got more than half of the roughage in the form of bean straw.

3. Supplementing bean straw with cured beet tops materially improved the ration and decreased the scouring resulting from the bean straw as fed alone, but did not produce gains as large as the ration in which alfalfa constituted the entire roughage.

4. The value of bean straw depends largely upon the method in which it is used. As the sole roughage its value is low, but as a substitute for one-half of the alfalfa in the ration, its value may be equal to alfalfa hay.

#### ACKNOWLEDGMENTS

These experiments were made possible through the cooperation of the Wyoming Board of Charities and Reform, and William Moncur, former Superintendent of the Wyoming Industrial Institute. All livestock, equipment, feed, and labor were supplied by the Wyoming Industrial Institute. The organization, supervision, and collection of data were handled by the Wyoming Agricultural Experiment Station, Division of State Farms.

The Agricultural Advisory Council consisting of Earl T. Bower, A. L. Alcott, Lloyd Wilson, H. H. Horrell, C. C. Gay, and S. H. Black gave valuable assistance in outlining these experiments. Officials of the Holly Sugar Company of Worland, and the Great Western Sugar Company of Lovell cooperated in securing supplies of dried beet pulp during seasons when this feed was limited.

The following publications of the Wyoming Experiment Station may be had upon request: (Revised list, January, 1941).

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