T H E S I S

FATTENING LAMBS IN THE SAN LUIS VALLEY

A Study of Gains Produced by Various Feeds Supplementing Field Peas

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Submitted by

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for the Degree of Master of Science

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August 29, 1927.

THIS THESIS HAS BEEN READ

APPROVED AND RECOMMENDED

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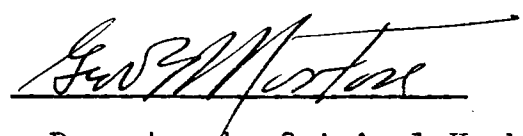

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INTRODUCTION

The San Luis Valley is located in the south-central part of Colorado, between the Sangre de Cristo or Culebra Mountains on the east and the San Juan Mountains on the west. It is the largest mountain valley in the state, being about 45 miles wide and 90 miles long. The elevation of the Valley is high, its lowest point being over 7500 feet above sea level. The mountain ranges, which surround the valley, have a very decided effect on the climate, breaking the cold winds and robbing the clouds of their moisture, so that, the average rainfall is only six to eight inches. The San Luis Valley is supposed to be originally the bed of a large lake, which upon receding left a very fertile and productive sedimentary soil. Since the rainfall is very light, an extensive irrigation system has been developed, which with such a soil, provides very favorable conditions for the growing of crops and livestock.

INTRODUCTION OF FIELD PEAS

Until the beginning of the 20th century, grain farming was practiced most extensively. About 1900, soil depletion was apparent and a more extensive livestock system was developed. The practice of growing leguminous crops, such

as field peas and alfalfa, to aid in restoring soil fertility was started about this time. It was under such conditions that the field pea or Canadian field pea was first introduced. Being a legume and a cool weather crop, it seemed the best one available for restoring and maintaining soil fertility.

The field pea proved to be not only an excellent soil builder but also a good feed for livestock. As a feed for fattening lambs and hogs it has proved very valuable to the valley.

HISTORY OF LAMB FEEDING IN THE VALLEY

The San Luis Valley is surrounded on three sides by large national forests on which many thousands of sheep are grazed. These range flocks furnish large numbers of lambs in the early fall just at a time when the field peas are fully matured. Early feeders found that pasturing peas with lambs was a cheap method of harvesting the pea crop and they obtained very good results by turning in some of these lamb flocks and allowing them to graze at will on the peas. In this way they harvested the pea crop with a minimum amount of labor and expense. Early feeders obtained very satisfactory results at that time and records show a death loss of rarely over one to two percent.[1] As a result, lamb feeding grew to be one of the most important industries in the San Luis Valley.

Table No. I shows the rapid increase in number of lambs

fed up to the peak of feeding operations, which was reached in 1908.

TABLE NO. I

GROWTH OF THE LAMB FEEDING INDUSTRY IN THE SAN LUIS VALLEY - 1901-1908

1901-02	15,000 Lambs Fed (2)
1902-03	16,000 Lambs Fed (3)
1903-04	76,000 Lambs Fed (3)
1904-05	181,000 Lambs Fed (3)
1905-06	300,000 Lambs Fed (3)
1906-07	380,000 Lambs Fed (4)
1907-08	450,000 Lambs Fed (5)

During the winter of 1907-08 there was evidence that the industry was being over-done. Depending largely on peafields alone, the feeders found that heavy snow falls made it necessary to ship many of these lambs while they were still quite thin. Death losses from the field peas were noted at this time and the numbers of lambs fed decreased steadily.

DEATH LOSS RESULTING FROM PASTURING LAMBS IN THE PEAFIELD

During the very peak of lamb feeding operations, valley feeders became alarmed over a decided increase in death losses among pea fed lambs.[1] From the one and two percent losses of former years, the death rate increased to such proportions as to make lamb feeding almost prohibitive. Some feeders reported losses as high as eight percent[1]. While others noted no marked increase, this high death loss was sufficient to materially

reduce the number of lambs fed in the San Luis Valley. It is estimated that during the season of 1914-15 about 260,000[6] lambs were fattened on field peas and in 1926-27 only 70,000 lambs were fed as compared with the 450,000 lambs fed in 1907-08.

In most cases feeders experienced their heaviest losses when lambs were half-fat rather than when thin. As a result, thousands of lambs were shipped out of the valley in an unfinished condition about the first of each year. The market price for feeders was usually high at that time, and valley feeders made most of their profit from the increase in market price for feeder lambs rather than from the gains produced by the feeding of field peas.

PREVENTIVE MEASURES ATTEMPTED

With the death loss problem as the chief factor in the lamb feeding industry, we find feeders throughout the feeding district adopting new methods of management, seeking to reduce this death loss. The methods most commonly used were; herding the lambs on the peafield for only a limited period each day; and feeding of different supplementary feeds with the field peas.

The most common method practiced was, to limit the amount of peas the lambs could consume, by herding them on peas a limited time each morning and afternoon. The practice was to start them on peas gradually and slowly increase the grazing time until the lambs spent several hours each day in the

peafield. The lambs were corralled between the feeding periods without any supplementary feed.

This method of feeding was not without its disadvantages. First, it did not in all instances lower the death losses, and second, in limiting the ration, feeders had difficulty in getting sufficient gains on their lambs.

Some feeders claimed that lambs herded on the peafields and corralled between feeding periods without additional feed ate as many peas per day as those that were allowed to remain on the peafields the entire day. This led some feeders to adopt the practice of feeding some supplementary feed, such as wheat straw or alfalfa, while the lambs were in the corral.

When such a practice was resorted to, lambs were not so ravenous when turned on the peafield, and were less likely to gorge themselves on peas. As in the other methods of feeding peas, the results were not wholly satisfactory. A few feeders, who followed this practice, experienced as heavy death losses as did those who had used no supplementary feed to keep their lambs filled. However, in some cases greater gains were produced by the use of these supplementary feeds.

In order to investigate the causes of death losses among pea fed lambs, the Colorado Agricultural Experiment Station has been conducting a series of feeding experiments near Monte Vista since 1921. The primary aim of these investigations has been to determine the specific causes of this high death rate in pea fed lambs. In addition the station has endeavored to find the best feeds or combination of feeds, which when

added to the field pea ration, would prevent or lower death losses and produce higher gains.

The rations used in the different experiments carried on by the Colorado Agricultural Experiment Station in the San Luis Valley have been used in this thesis as the basis for a study of gains made and the economy of gains produced by different feeds supplementing field peas for fattening lambs.

EXPERIMENTAL FEEDING TESTS CONDUCTED BY THE VETERINARY PATHOLOGY SECTION OF THE COLORADO AGRICULTURAL EXPERIMENT STATION

The Veterinary Pathology Section of the Colorado Agricultural Experiment Station conducted the first feeding tests in 1921-22 and 1922-23. It was their purpose to investigate the death loss problem from a pathological standpoint. They attempted to isolate the Hemorrhagic Septicemia organism which it was thought might be responsible for the excessive death loss and to produce a vaccine that would cause an immunity among pea fed lambs for this disease[7].

EXPERIMENT NO. I.

October 27, 1921 - January 23, 1922 - 90 Days.

Objects of the Test

1. To determine whether field peas were responsible for the death losses among pea fed lambs in the San Luis Valley.

2. If peas were responsible, to find a safe method of utilizing field peas as a lamb feed.

Five hundred native lambs were used in the test. These showed a predominance of Hampshire breeding. The lambs were divided according to weight into five uniform lots of 100 lambs each and fed the following rations:

Lot I. Pastured on peafield with no attempt made to limit the ration.

Lot II. Herded on peafield, starting in with five minutes grazing each morning and afternoon and increasing five minutes every third day until the lambs were on full feed.

Lot III. Confined in a corral and fed pea hay.

Lot IV. Fed on alfalfa hay alone for 10 days, then the same system was followed as with Lot II, except that alfalfa was kept before them at all times when in the corral.

Lot V. Fed wheat straw alone for seven days, then the same system was followed as with Lot II, keeping wheat straw before them at all times when in the corral.

One-half of the lambs in each lot were vaccinated with Hemorrhagic Septicemia vaccine to determine if Hemorrhagic Septicemia was the cause of the death loss.

TABLE NO. II

RESULTS OF EXPERIMENT NO. I

Gains Produced by Different Rations and Methods of Feeding
October 27, 1921-January 23, 1922 - 90 Days

Table Based on One Average Lamb

Lot Number	I	II	III	IV	V
Rations Fed	Peas, Pastured	Peas Herded	Pea Hay (Dry Lot)	Peas, Herded Wheat Straw	Peas, Herded Alfalfa
Average Initial Weight Lbs:	49.23	49.23	49.23	49.23	49.23
Average Final Weight Lbs:	67.68	60.0	60.5	60.8	59.2
Average Total Gain Lbs:	18.45	10.77	11.27	11.57	9.97
Feed Required for 100 Lbs. Gain *:					
Average Cost of 100 Lbs. Gain *:					
Death Loss	9	1	0	3	2

*No Record.

Discussion of Results

The pastured lambs produced maximum gains which apparently was due to the method of feeding. Lambs having access to peas the entire day consumed larger quantities than did those herded on the peafield a limited time each day. However, a heavier death loss resulted in the pastured lot which would indicate that pasturing at will was not a safe method of feeding field peas.

The lambs in Lot II, herded on the peafield a limited time each morning and afternoon, apparently did not consume as much peas as did tthose in Lot I, resulting in the lower gains.

Although, the lambs in Lot III were given all the pea hay they would eat in dry lot, their gain for the 90 days was only 11.27 pounds as compared with 18.45 pounds gain made by the pastured lambs in Lot I. A good many peas shatter in raking and stacking tending to lower the food value of stack pea hay. This loss of valuable feed might probably account for the lower gains.made by Lot III, since the peas contain 19 percent protein as compared with 7.7 percent protein in the vines [9].

Lot IV, fed a ration of wheat straw and being herded on peas, made gains slightly higher than Lot II, which were herded on peas alone. The increased gain was apparently due to the added nutrients furnished by the wheat straw.

Lot V, fed a ration of peas, herded, and alfalfa, gained

0.8 pounds less than did Lot II, which were herded on peas alone. No apparent reason can be seen for the lower gains unless it was that the lambs lacked sufficient feed for fattening.

Pasturing of lambs on the peafield proved most effective in producing gains but the excessive death loss made such a practice most unprofitable. Where lambs were herded on peas a limited time each day, the losses were very low and only slightly increased when a supplementary feed was added to a ration of peas, herded.

This would indicate that the losses could be controlled by herding the lambs on the peafield and that the gains could perhaps be increased by the use of supplementary feeds.

EXPERIMENT NO. II.

October 20, 1922 - January 18, 1923 - 90 Days

Objects of the Second Test:

1. To continue the study of the methods of feeding field peas as in the first experiment.

2. To determine the effect of adding a carbonaceous feed, such as ground barley, to a peafield ration in reducing death losses.

3. To compare a ration of pea hay fed in dry lot to a ration of ground barley and alfalfa.

Five hundred range lambs were used showing Hampshire and Rambouillet breeding. The lambs were divided according to weight into five uniform lots of 100 lambs each and fed the following rations:

Lot I. Pastured on peafield with no attempt made to limit the ration.

Lot II. Herded on peafield starting in with five minutes grazing each morning and afternoon and increasing five minutes every third day until the lambs were on full feed.

Lot III. Confined in dry lot and fed pea hay.

Lot IV. Herded on peafield in the same manner as Lot II and fed ground barley in the corral.

Lot V. Fed ground barley and alfalfa in dry lot.

The lambs were not vaccinated in this test, since it was to be primarily a comparison between different rations and

methods of feeding peas.

TABLE NO. III

RESULTS OF EXPERIMENT NO. II

Gain Produced by Different Rations and Methods of Feeding
October 20, 1922-January 18, 1923 - 90 Days

Table Based on One Average Lamb

Lot Number:	I	II	III	IV	V
Rations Fed	Peas Pastured	Peas Herded	Pea Hay (Dry Lot)	Peas, Herded Gr. Barley	Gr. Barley Alfalfa (Dry Lot)
Average Initial Weight Lbs.	57.1	57.1	57.1	57.1	57.1
Average Final Weight Lbs.	74.2	67.0	64.5	72.1	73.4
Average Total Gain Lbs.	17.1	9.9	7.4	15.0	16.3
Feed Required for 100 Lbs. Gain*					
Average Cost of 100 Lbs. Gain*					
Death Loss	2	4	7	8	7

*No Record.

Discussion of Results

As in the previous year's experiment the lambs pastured on peas made the largest gains of the five lots. The lambs pastured on peas gained 7.2 pounds more than those herded on peas and 9.7 pounds more than those fed pea hay.

In Lot IV the lambs herded on peafield and fed ground barley made 5.1 pounds greater gains than those herded on peas alone, or the efficiency of the ration was increased 33 percent by the addition of barley in this instance.

The lambs in Lot V receiving a ration of ground barley and alfalfa made 16.3 pounds gain in the 90 days as compared with 17.1 pounds gain made by pasturing of lambs on peas. The losses were slight in the pastured lot during this test and heavy in the grain fed lots. There were indications, however, that the losses were principally due to an over-feeding of grain rather than to the peas.

TABLE NO. IV

SUMMARY OF GAINS SECURED DURING FIRST TWO YEARS THAT FEEDING TESTS WERE CONDUCTED - 1921-1923

Rations Fed	Peas Pastured	Peas Herded	Pea Hay (Dry Lot)	Peas, Herded Wheat Straw	Peas, Herded Alfalfa	Peas, Herded Gr. Barley	Gr. Barley Alfalfa (Dry Lot)
No. of Yrs. Ration Fed	2	2	2	1	1	1	1
Average Gain	17.77	10.3	9.3	11.57	9.97	15.0	16.3
Average Feed Required for 100 Lbs. Gain*							
Average Cost of 100 Lbs. Gain*							
Death Loss Total	11	5	7	3	2	8	7
Average Death Loss	5.5	2.5	3.5	3	2	8	7

*No Record.

EXPERIMENTAL FEEDING TESTS CONDUCTED BY THE ANIMAL INVESTIGATIONS SECTION OF THE COLORADO AGRICULTURAL EXPERIMENT STATION

From the two years' experiments, the Veterinary Pathology Section failed to find any specific causes for the so-called "peafield disease". Results indicated that Hemorrhagic Septicemia alone could not be responsible for the excessive death loss. It was then decided to make further investigations from a nutritional standpoint and this work was turned over to the Animal Investigations Section of the Colorado Agricultural Experiment Station. However, the Veterinary Pathology Section cooperated in a measure and experimented with vaccines in conjunction with the various feeding tests during the following four years.

EXPERIMENT NO. III.

October 22, 1923 - January 30, 1924 - 100 Days.

This was the first of a series of tests conducted by the Animal Investigation Section of the Colorado Agricultural Experiment Station. It was intended to continue the investigations started by the Veterinary Pathology Section in determining the cause of the death losses among pea fed lambs and if possible to find some methods of feeding field peas that would eliminate the excessive losses.

The objects of the 1923-24 test were as follows:

1. To continue the study of the effect on death loss of peas, pastured at will.

2. To test the value of adding alfalfa to a peafield, herded ration in controlling death loss.

3. To compare the value of feeding a balanced ration of peas, herded, and oat hay with an unbalanced ration of peas, herded, oat hay and barley in controlling death losses.

4. If the balanced or unbalanced ration did not prevent losses, to test the value of adding cull potatoes and alfalfa to these rations and note their effect in controlling death loss.

5. To study the effect on death loss of feeding barley and alfalfa in the dry lot as compared with the foregoing rations.

Five hundred native Hampshire and Rambouillet lambs were used in this test. They were divided according to

weight into five uniform lots of 100 lambs each and fed the following rations:

Lot I. Pastured on peafield.

Lot II. Herded on peafield and fed alfalfa in the corral.

Lot III. Herded on peafield and fed oat hay in the corral.

Lot IV. Herded on peafield and fed barley and oat hay in the corral.

Lot V. Fed barley andalfalfa in dry lot.

In addition to these rations, other supplementary feeds were fed at different intervals during the test as is shown in Table No. V. The supplementary feeds fed were:

Lot I. Cull potatoes.

Lot II.

Lot III. Cull potatoes and alfalfa.

Lot IV. Cull potatoes and alfalfa.

Lot V. Oat hay.

One-half of the lambs in each lot were vaccinated with Hemorrhagic Septicemia vaccine. No definite conclusions were obtained during this test.

TABLE NO. V

RESULTS OF EXPERIMENT NO. III

Gains Produced by Different Rations and Methods of Feeding
October 22, 1923-January 30, 1924 - 100 Days

Table Based on One Average Lamb

Lot Number	I	II	III	IV	V
Original Rations Fed	Peas Pastured	Peas Herded Alfalfa	Peas Herded Oat Hay	Peas, Herded Barley Oat Hay	Barley Alfalfa
Supplementary Ration Fed*	Cull Potatoes		Alfalfa: Cull Potatoes	Alfalfa Cull Potatoes	Oat Hay (Dry Lot)
Average Initial Weight Lbs:	56.8	56.2	54.6	55.6	56.9
Average Final Weight Lbs:	86.2	79.1	74.1	80.2	82.0
Average Total Gain Lbs:	29.4	22.9	19.5	24.6	25.1
Feed Required for 100 Lbs. Gain					
Peafield Acres:	.88	.97	1.29	.76	
Alfalfa Lbs:		914.4	565.8	395.8	1149.9
Barley Lbs.				538.4	479.3
Oat Hay Lbs:			1071.5	792.6	60.0
Cull Potatoes Lbs:	6.47		297.0	297.8	
Cost of 100 Lbs. Gain	$12.00	$18.45	$24.69	$24.06	$16.13
Death Loss Total:	9	4	12	15	7

Price of Feeds: Fieldpeas, $13.45 per Acre; alfalfa, $12.00 per Ton; Oat Hay, $6.00; Barley, $1.55 per Cwt.; Cull Potatoes, $0.25 per Cwt.

*Dates when supplementary feeds were fed:

Lot I. Potatoes fed January 23-January 30.

Lot II.

Lot III. No peas November 20-December 4.

Potatoes fed November 20-December 4, December 17-January 30.

Alfalfa fed November 20-December 4, December 17-January 30.

Lot IV. No peas November 20-December 4.

Potatoes fed November 20-December 4, December 17-January 30.

Alfalfa fed November 20-December 4, December 17-December 31, January 20-January 30.

Lot V. Oat hay fed November 20-December 31.

Discussion of Results

The gains produced in this year's test show a decided increase over the previous year's work.

Lot I received a small quantity of cull potatoes the last eight days of the feeding test, which would not affect their gains to any noticeable extent. Hence, Lot I may be considered as receiving a ration of peas, pastured.

Pasturing lambs on peas again proved a better method of producing gains as compared to the rations where supplementary feeds were added to the peas, herded. The ration of peas, pastured, produced 4.3 pounds greater gains than the second highest gaining lot, which received a ration of barley, and alfalfa with a supplementary feed of oat hay for 41 days. A comparison of Lot II with Lot I, shows that the ration of peas, herded and alfalfa made 6.5 pounds less gain in 100 days and required .09 acres more peas in addition to the 914.4 pounds of alfalfa for 100 pounds of gain. Lot II cost $6.45 more to produce the 100 pounds of gain than did Lot I.

Lots III and IV received cull potatoes and alfalfa at different intervals during the test in addition to the original ration (see Table No. V). The following explanation gives the dates of feeding cull potatoes and alfalfa and the results obtained.

The original ration was fed in Lots III and IV until November 20th when six and seven lambs were lost from these two lots, respectively. At this time the lambs were removed from the peafield and fed cull potatoes and alfalfa in the

corral for a period of fourteen days. The losses were checked immediately. On December 4th the lambs were put back on peas, with the original ration and again the losses became heavy in these lots. On December 17th the lambs were fed cull potatoes and alfalfa in addition to the original ration and again the losses were almost immediately checked. From January 1st to January 20th only the potatoes were fed with the original ration and a total of seven lambs were lost in the two lots. This would indicate that the alfalfa was necessary to control the losses. The last ten days of the feeding test both alfalfa and cull potatoes were fed and two lambs were lost in Lot III.

Death losses were checked in every case when cull potatoes and alfalfa were fed, which would tend to show that these two feeds had some effect in controlling the losses.

The gains made by these two lots were very good considering the abrupt changes made in their rations. Lot IV made 5.1 pounds greater gain than did Lot III. The increased gain may in part be attributed to the addition of barley to the ration.

In comparing the feed required for 100 pounds of gain, we find the 538.4 pounds of barley replaced .53 acres of peas, 278.9 pounds of oat hay, and 70 pounds of alfalfa. The cull potatoes required for 100 pounds of gain was practically the same in the two lots.

In comparing the cost of 100 pounds of gain, Lot III

cost $24.69 and Lot IV $24.06 or a saving of $0.63 from feeding barley.

Oat hay was added to the ration of barley and alfalfa in Lot V from November 20th to December 30th to see if it contained any toxic material that might be causing the losses in Lots III and IV. No definite results could be noticed by the addition of oat hay to the ration. The lambs in this lot gained 25.1 pounds during the feeding period. The heavy gains made by this lot may be due to the abundance of feed consumed during the test.

The death losses were unusually high during this test, maximum losses occurring in Lots III and IV. Lot II fed a ration of peas, herded, and alfalfa showed a minimum loss. In Lots III and IV the losses were checked by the addition of cull potatoes and alfalfa, which would indicate that they may protect lambs against this disease.

The addition of cull potatoes and alfalfa to the original ration appeared to have a decided effect in checking the death loss among lambs fed peas and oat hay, and peas, oat hay, and barley. However, it was thought further investigations should be conducted to substantiate this conclusion. In the following year's test it was planned to continue the study of the value of cull potatoes and alfalfa in controlling losses.

TABLE NO. VI

RESULTS OF EXPERIMENT NO. IV

Gains Produced by Different Rations and Methods of Feeding
October 23, 1924- January 31, 1925 - 100 Days

Table Based on One Average Lamb

Lot Number	I	II	III	IV	V
Rations Fed	Peas Pastured	Peas Herded Alfalfa	Peas Pastured Cull Potatoes Alfalfa	Peas Herded Cull Potatoes Alfalfa	Barley Cull Potatoes Alfalfa
Average Initial Weight Lbs:	61.5	62.7	63.1	62.5	61.6
Average Final Weight Lbs:	75.7	75.6	83.3	79.5	82.3
Average Total Gain Lbs:	14.2	12.9	20.2	17.0	20.7
Feed Required for 100 Lbs. Gain					
Peas Acres:	1.68	.80	1.17	.84	
Alfalfa Lbs.		674.0	1696.0	1071.5	1142.0
Cull Potatoes Lbs:			259.5	516.3	309.8
Barley Lbs.					439.3
Cost of 100 Lbs. Gain	$22.60	$25.92	$15.46	$19.02	$14.43
Death Loss Total	3	1	0	0	2

Price of Feeds:

Field Peas	$13.45 per Acre
Alfalfa	$12.00 per Ton
Cull Potatoes	$ 0.25 per Cwt.
Barley	$ 1.55 per Cwt.

EXPERIMENT NO. IV [11]

October 23, 1924 - January 31, 1925 - 100 Days

Objects of the Second Test

1. To continue a study of the value of alfalfa in controlling death losses among lambs herded on peas.

2. To determine the effect of cull potatoes and alfalfa in controlling losses when added to a ration of peas both pastured and herded.

3. To compare the effect of cull potatoes and alfalfa with a carbonaceous feed, such as barley in controlling losses.

Five hundred native lambs were used in this test, showing Hampshire and Rambouillet breeding. They were divided according to weight into five uniform lots of 100 lambs each. The five lots were fed the following rations:

Lot I. Pastured on peafield with no attempt made to limit the ration.

Lot II. Herded on peafield and fed alfalfa in the corral.

Lot III. Pastured on peafield as in Lot I, with the additional feed of cull potatoes and alfalfa in the corral.

Lot IV. Herded on peafield and fed cull potatoes and alfalfa in the corral.

Lot V. Fed barley, alfalfa andcull potatoes in dry lot.

Again one-half of the lambs in each lot were vaccinated with Hemorrhagic Septicemia. No definite results were obtained in favor of the vaccination.

Discussion of Results

The lambs pastured on the peafield failed to produce as high gains as in the three previous year's tests. During the last month of the experiment, the ground was covered with about four inches of snow, which made it most impossible for the lambs to obtain peas. Lot I had no additional feed, which undoubtedly accounts for their low gains. In comparing Lot I in this test with Lot I the previous year, we find the lambs gained 15.2 pounds less in the 100 days period and required $10.60 more to produce 100 pounds of gain.

Lot II fed a ration of peas, herded, and alfalfa made 12.9 pounds gain which was 1.3 pounds less than the gains made by Lot I. Lot II, as in Lot I, were not able to secure peas on account of the snow. When Lot II is compared with Lot II the previous year on the same ration, we find the lambs made 10 pounds less gain and it cost $7.47 more to produce 100 pounds of gain.

Lots III and IV were fed the same ration peas, cull potatoes and alfalfa, except for the difference in method of feeding the peas. Pasturing of lambs on the peafield (Lot III) proved more effective in producing gains than did herding (Lot IV). Pasturing produced 3.2 pounds greater gains than herding. Pasturing required .33 acres more peas and 594.5 pounds more alfalfa to produce 100 pounds of gain than did herding but needed 256.8 pounds less of cull potatoes to produce the 100 pounds gain.

Herding cost $3.56 more for 100 pounds of gain than did

-pasturing.

The lambs in Lot V, fed in dry lot on barley, cull potatoes, and alfalfa, made the cheapest and largest gains of the five lots. Their gain was 20.7 pounds for the 100 days on feed. This lot required 439.3 pounds of barley, 309.8 pounds of cull potatoes, and 1142 pounds of alfalfa to produce 100 pounds of gain. The cost of 100 pounds of gain was $14.43. The heavier gains in this lot may be attributed in part to the abundance of feed throughout the test period.

Although the death losses were very light during this year's test, the cull potatoes and alfalfa again appeared to have some effect in controlling losses. Since the losses were so low it was decided that it would be necessary to carry on further investigations before any definite conclusions could be reached.

EXPERIMENT NO. V [12].

October 24, 1925 - February 1, 1926 - 100 Days.

Objects of the Third Test

1. To continue the feeding of the rations, peas, pastured, alone and peas, herded, with alfalfa.

2. To further study the effect of cull potatoes and alfalfa when added to a ration of peas both pastured and herded in controlling losses among pea fed lambs.

3. To determine the effect of cull potatoes and alfalfa with a carbonaceous feed, such as barley, in controlling losses.

Five hundred range lambs were used, showing a predominance of Hampshire breeding. They were divided according to weight into five uniform lots of 100 lambs each and fed the following rations:

Lot I. Pastured on peafield.

Lot II. Herded on peafield and fed alfalfa in the corral.

Lot III. Pastured on peas and fed cull potatoes and alfalfa in the corral.

Lot IV. Herded on peas and fed cull potatoes and alfalfa in the corral.

Lot V. Fed corn and alfalfa in dry lot.

One-half of the lambs in each lot were vaccinated with a filtrate, Vibrion Septique. This filtrate was produced from an anacrobe often found in the soil and in the bodies of dead lambs [7]. No definite results were obtained from this test.

TABLE NO. VII

RESULTS OF EXPERIMENT NO. V

Gains Produced by Different Rations and Methods of Feeding
October 24, 1925-February 1, 1926 - 100 Days

Table Based on One Average Lamb

Lot Number	I	II	III	IV	V
Rations Fed	Peas Pastured	Peas Herded Alfalfa	Peas, Pastured Cull Potatoes Alfalfa	Peas, Herded Cull Potatoes Alfalfa	S. Corn Alfalfa (Dry Lot)
Average Initial Weight Lbs:	65.1	65.5	65.7	64.2	63.7
Average Final Weight Lbs:	83.0	80.2	84.0	83.6	86.0
Average Total Gain Lbs:	17.9	14.7	18.3	19.4	22.3
Feed Required for 100 Lbs Gain					
Peafield Acres:	1.17	.95	.76	.77	
Alfalfa Lbs.		865.0	594.0	578.6	892.5
Cull Potatoes Lbs:			204.4	215.5	
Shelled Corn Lbs:					495.2
Cost of 100 Lbs. Gain	$15.74	$19.97	$14.29	$14.37	$14.27
Death Loss Total:	1	0	0	2	0

Price of Feeds:

Fieldpeas	$13.45 per Acre
Alfalfa	$12.00 per Ton
Cull Potatoes	$ 0.25 per Cwt.
Shelled Corn	$ 1.80 per Cwt.

Discussion of Results

Weather conditions were very severe during the winter of 1925-26 and made it almost impossible to feed field peas. A heavy blanket of snow covered the peas during almost the entire feeding period. As a result the gains for this year's experiment were considerably lower than in previous years.

Although, the 17.9 pounds gain made by Lot I is not the highest of the five lots, it may be considered a very good gain since the lambs were unable to get much of the peas on account of the snow. The lambs in this lot required 1.17 acres of peas to produce 100 pounds of gain. This is considerably more than where supplementary feeds were fed. The cost of 100 pounds of gain was $15.74.

The ration of peas, herded, and alfalfa did not prove as effective in producing gains in fattening lambs as did pasturing of peas alone. Lot II made 3.2 pounds less gain in the 100 day period than Lot I. It required .95 acres of peas and 865 pounds of alfalfa to produce 100 pounds of gain as compared to the 1.17 acres of peas in Lot I. A comparison of the cost of 100 pounds of gain, shows that Lot II cost $4.23 more than did Lot I.

In this year's test, when lambs were fed cull potatoes and alfalfa in addition to a ration of peas both herded and pastured, we find that peas, herded, produced greater gains than did the lambs pastured on peas. Lambs herded on peas gained 19.4 pounds as compared with 18.3 pounds for the lambs pas-

tured. However, herding required .01 acres more peas and 11 pounds more potatoes but 15 pounds less alfalfa than did the pastured lambs for 100 pounds of gain. Herding cost $0.08 more than did pasturing for the 100 pounds of gain.

As in the previous year's test, the lambs fed in dry lot made the highest and cheapest gains of the five lots. The heavier and cheaper gains for the shelled corn and alfalfa lot were apparently due to the abundance of feed furnished this lot. The lambs in this lot required 892.5 pounds of alfalfa and 495.2 pounds of shelled corn for 100 pounds of gain. The cost was $14.27 per 100 pounds gain.

Because of the unfavorable weather conditions in the San Luis Valley during the winter of 1925-26, the gains were comparatively low. The losses in this test were much lower than in previous years. Only three lambs died during the test. One lamb died in Lot I and two in Lot IV.

Again, no definite conclusions were obtained whereby the death losses could be prevented and the work was carried on the following year. It was planned to continue feeding cull potatoes and alfalfa to determine their effect in controlling losses among pea fed lambs.

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EXPERIMENT NO. VI .

October 24, 1926 - January 30, 1927 - 98 Days.

Objects of the Fourth Test

1. To continue a study of the value of cull potatoes and alfalfa in a peafield ration.

2. To test the value of a simple mineral mixture in controlling death loss among pea fed lambs.

3. To test the value of a corn and alfalfa ration fed to lambs on the peafield.

4. To determine the value of an adequate windbreak for fattening lambs.

Five hundred range lambs were used showing a predominance of Hampshire and Rambouillet breeding. The lambs were divided according to weight into five uniform lots of 100 lambs each and fed the following rations:

Lot I. Pastured on peafield.

Lot II. Pastured on peafield and fed cull potatoes and alfalfa in the corral.

Lot III. Pastured on peafield and fed a simple mineral mixture in the corral.

Lot IV. Pastured on peafield and fed shelled corn and alfalfa in the corral.

Lot V. Fed the same ration as Lot IV and had a windbreak entirely around their corral instead of panels.

One-half of the lambs in each lot were vaccinated with the Vibrion Septique filtrate. No definite conclusions could be reached from the results obtained.

TABLE NO. VIII

RESULTS OF EXPERIMENT NO. VI

Gains Produced by Different Rations and Methods of Feeding
October 24, 1926-January 30, 1927 - 98 Days

Table Based on One Average Lamb

Lot Number		I	II	III	IV	V
Rations Fed		Peas Pastured	Peas, Pastured Cull Potatoes Alfalfa	Peas, Pastured Mineral Mixture	Peas, Pastured Shelled Corn Alfalfa	Peas, Pastured Shelled Corn Alfalfa (Shelter)
Average Initial Weight	Lbs.	69.1	65.5	66.8	70.5	64.8
Average Final Weight	Lbs.	92.1	95.3	93.6	101.3	98.9
Average Total Gain	Lbs.	23.0	29.8	26.8	30.8	34.1
Feed Required for 100 Lbs. Gain						
Peafield	Acres	.74	.46	.82	.41	.36
Alfalfa	Lbs.		377.3		300.6	324.2
Cull Potatoes	Lbs.		342.3			
Shelled Corn	Lbs.				256.9	226.7
Mineral Mixture	Lbs.			16.3		
Cost of 100 Lbs. Gain		$9.95	$9.31	$11.39	$11.93	$10.81
Death Loss		6	3	9	6	5

Price of Feeds: Fieldpeas, $13.45 per Acre; Alfalfa, $12.00 per Ton; Cull Potatoes, $0.25 per Cwt.; Shelled Corn, $1.80 per Cwt.; Mineral Mixture, $2.20 per Cwt.

Discussion of Results

Weather conditions in the valley were very favorable for lamb feeding during the winter of 1926-27. Peafields were never covered with snow and the lambs had an abundance of feed during the entire test.

Comparing Lot II with Lot I, we find that the lambs fed a ration of peas, pastured, cull potatoes and alfalfa gained 6.8 pounds more than those pastured on the peafield alone. Lot II required 377.3 pounds of alfalfa, 342.3 pounds of cull potatoes and .46 acres of peas for 100 pounds gain as compared with .74 acres of peas needed by Lot I. Lot II shows $0.64 or 6.4 percent lower cost for 100 pounds of gain than does the lot pastured on peas.

Lot III received a ration of peas, pastured, and a simple mineral mixture composed of 40 parts of hardwood ashes, 40 parts of bone meal, and 20 parts of common salt. This ration increased the gains 3.8 pounds as compared with the ration of peas, pastured, alone. Besides the 16.3 pounds of mineral mixture, Lot IV required .08 acres more peas to produce 100 pounds of gain than did Lot I. It cost $1.44 more to produce 100 pounds of gain in the mineral lot than in the lot fed peas, pastured.

Lot IV and V were fed the same ration, peas, pastured, shelled corn and alfalfa. Lot V had a six foot tight board fence around their corral instead of panels. This windbreak proved quite effective in producing heavier gains. The lambs

in Lot V gained 3.3 pounds more than did those in Lot IV. A comparison of the amounts of feed needed for 100 pounds of gain, shows Lot V ate .05 acres less peas, 30 pounds less shelled corn and 24 pounds more alfalfa than did Lot III. The windbreak lot saved $1.06 per 100 pounds gain.

The gains secured in this test were higher and were produced at a lower cost than in previous years. This was probably due to the excellent weather conditions and abundance of feed throughout the feeding period.

Lot III or the mineral fed lot had the highest percent of loss which would indicate that the mineral mixture had no apparent effect in controlling losses among pea fed lambs. Where cull potatoes and alfalfa were fed with field peas, we again find the lowest losses. This further confirms the idea that cull potatoes and alfalfa when added to a peafield ration seems to check the excessive death losses.

TABLE NO. IX

SUMMARY OF GAINS PRODUCED AND FEED REQUIRED AND COST OF GAINS FOR RATIONS USED

1923-1927

Rations Fed		Peas Pastured	Peas Herded Alfalfa	Peas Pastured Potatoes Alfalfa	Peas Herded Potatoes Alfalfa	Peas Herded Oat Hay	Peas Herded Oat Hay Barley	Peas Pastured Mineral Mixture	Peas Pastured Shelled Corn Alfalfa	Peas Pastured Shelled Corn Alfalfa (Shelter)	Barley Alfalfa (Dry Lot)	Barley Potatoes Alfalfa (Dry Lot)	Shelled Corn Alfalfa (Dry Lot)
Supplementary Rations Fed a Limited Time						Potatoes Alfalfa	Potatoes Alfalfa				Oat Hay		
No. of Yrs. Ration Fed		4	3	3	2	1	1	1	1	1	1	1	1
Average Gain		21.1	16.8	22.7	18.2	19.5	24.6	26.8	30.8	34.1	25.1	20.7	22.3
Feed for 100 Lbs. Gain													
Peafield	Acres	1.12	.88	.80	.81	1.29	.76	.82	.41	.36			
Alfalfa	Lbs.		817.8	889.1	825.0	565.8	395.8		300.6	324.2	1149.9	1142.0	892.5
Potatoes	Lbs.			268.7	365.9	297.0	297.8					309.8	
Oat Hay	Lbs.					1071.5	792.6				60.0		
Shelled Corn	Lbs.								256.9	226.7			495.2
Barley	Lbs.						538.4				497.3	439.3	
Mineral Mixture	Lbs.							16.3					
Cost of 100 Lbs. Gain		$15.07	$21.44	$13.02	$16.69	$24.69	$24.06	$11.39	$11.93	$10.87	$16.13	$14.43	$14.27
Death Loss	Total	19	5	3	2	12	15	9	6	5	7	2	0
Average Death Loss per Year		4.4	1.6	1.	1.	12	15	9	6	5	7	2	0

Price of Feeds: (An average of various years used)

Field Peas	$13.45 per Acre
Alfalfa	$12.00 per Ton
Potatoes	$ 0.25 per Cwt.
Corn	$ 1.80 per Cwt.
Barley	$ 1.55 per Cwt.
Oat Hay	$ 6.00 per Ton

A STUDY OF GAINS PRODUCED BY VARIOUS FEEDS SUPPLEMENTING FIELD PEAS FOR FATTENING LAMBS IN THE SAN LUIS VALLEY

The object of the following tables with discussions will be a comparison of gains and economy of gains produced by the various feeds supplementing field peas, that were used by the Colorado Agricultural Experiment Station in their six years' experiments for fattening lambs in the San Luis Valley.

TABLE NO. X

COMPARISON OF GAINS MADE BY PASTURING, HERDING, AND THE FEEDING OF STACKED PEA HAY TO LAMBS IN THE SAN LUIS VALLEY - 1921-22 and 1922-23

Table Based on One Average Lamb

Ration Fed		Peas, Pastured	Peas, Herded	Pea Hay
Average Initial Weight	Lbs:	53.2	53.2	53.2
Average Final Weight	Lbs:	70.9	63.5	62.5
Average Total Gain	Lbs:	17.7	10.3	9.3
Feed Required for 100 Lbs. Gain*				
Cost for 100 Lbs. Gain*				
Average Death Loss (Total for 2 Years)		11	5	7
Average Death Loss		5.5	2.5	3.5

*No Record.

Discussion of Results

Lambs pastured on the peafield, with no attempt made to limit the amount of peas they consumed, made 41.8 percent greater gains than did those herded on peas a limited time each day. The pastured lambs undoubtedly consumed small quantities of peas at frequent intervals during the day and as a result ate less ravenously. Lambs herded on peas a limited time daily, have a tendency to gorge themselves but in the end do not consume as great quantities as do the pastured lambs.

A comparison of the ration of peas, pastured, with the feeding of stacked pea hay in dry lot, shows the pastured lambs gaining 47.5 percent more than those fed stacked pea hay. The lambs fed stacked pea hay had access to an abundance of feed at all times. A good many peas shatter in raking and stacking, somewhat lowering the food value of stacked pea hay. This loss of valuable feed may account for the lower gains and lower loss made by this lot.

Morton[15] reports lambs pastured on peafield making gains of 18.3 pounds in 14 weeks as compared with 5.8 pounds gain made by lambs fed pea hay.

The lambs herded on peas made 9.7 percent greater gains than did those fed pea hay. The increased gains may be attributed in part to the greater abundance of valuable feed obtained by the herded lambs. The death loss was heavier in the pea hay fed lot, seven lambs were lost as compared to five lost

from the herding of lambs on peas.

The total losses for the two years' were lowest for the herding method and highest for the pasturing method. Thus, it would seem that herding of lambs on peas would lower the losses.

TABLE NO. XI

GAINS MADE BY HERDING LAMBS ON PEAFIELD AS COMPARED TO GAINS ON PEAS, HERDED AND FED WHEAT STRAW

1921-22

Table Based on One Average Lamb

Ration Fed		: Peas, Herded	: Peas, Herded Wheat Straw
Average Initial Weight	Lbs.	: 49.23	: 49.23
Average Final Weight	Lbs.	: 60.0	: 60.8
Average Total Gain	Lbs.	: 10.77	: 11.57
Feed Required for 100 Lbs. Gain	*	:	:
Cost of 100 Lbs. Gain	*	:	:
Death Loss	Total	: 1	: 3

*No Record.

Discussion of Results

Wheat straw is low in crude protein and fat but high in carbohydrates, which makes it a poor feed for fattening lambs. However, when small quantities of wheat straw are fed with a concentrate, such as field peas, its value is increased. In the ration of peas, herded, and wheat straw, the lambs made 11 percent higher gains than when peas, herded, were fed alone.

The death loss was slightly increased when wheat straw was added to the peafield, herded, ration.

TABLE NO. XII

GAINS MADE BY HERDING LAMBS ON PEAS AS COMPARED TO GAINS ON PEAS, HERDED, AND FED ALFALFA - 1921-22

Table Based on One Average Lamb

Ration Fed		Peas, Herded	Peas, Herded Alfalfa
Average Initial Weight	Lbs.	49.23	49.23
Average Final Weight	Lbs.	60.0	59.2
Average Total Gain	Lbs.	10.77	9.97
Feed Required for 100 Lbs. Gain	*		
Cost for 100 Lbs. Gain	*		
Death Loss	Total	1	2

*No Record.

Discussion of Results

The addition of alfalfa to the peafield, herded, ration increased the gains 0.8 pounds or 7.4 percent as compared with the same ration without the alfalfa. The alfalfa furnishes a very palatable and nutritious feed which probably accounts for the greater gains. There seemed to be very little effect on death loss from these two rations.

TABLE NO. XIII

GAINS MADE BY A RATION OF PEAS, HERDED, AND ALFALFA AS COMPARED TO GAINS ON PEAS, HERDED, ALFALFA AND CULL POTATOES - 1924-25 and 1925-26

Table Based on One Average Lamb

Ration Fed		Peas, Herded Alfalfa	Peas, Herded Alfalfa Cull Potatoes
Average Initial Weight	Lbs.	64.1	63.4
Average Final Weight	Lbs.	77.8	81.6
Average Total Gains	Lbs.	13.7	18.2
Feed Required for 100 Lbs. Gain			
Field Peas	Acres	.88	.81
Alfalfa	Lbs.	769.5	825.5
Cull Potatoes	Lbs.		365.9
Cost of 100 Lbs. Gain		$22.95	$16.69
Death Loss	Total	1	2
Average Death Loss		0.5	1

Discussion of Results

The addition of cull potatoes to a ration of peas, herded, and alfalfa increased the gains 4.5 pounds on fattening lambs as compared with gains secured on a ration of peas, herded, and alfalfa. The lambs fed a ration of cull potatoes and alfalfa in addition to peas, herded, required .81 acres of peas, 825.5 pounds of alfalfa and 365.9 pounds of cull potatoes for 100 pounds of gain as compared with .88 acres of peas and 769.5 pounds of alfalfa needed by the lambs fed peas, herded, and alfalfa. The cull potatoes and alfalfa lot cost $6.26 less for 100 pounds of gain. The losses were very light from these two rations.

TABLE NO. XIV

GAINS MADE BY LAMBS ON A RATION OF PEAS, HERDED, CULL POTATOES, AND ALFALFA AS COMPARED TO GAINS ON PEAS, PASTURED, CULL POTATOES AND ALFALFA - 1924-25 and 1925-26

Table Based on One Average Lamb

Ration Fed		:Peas,Herded:Cull Potatoes Alfalfa	:Peas,Pastured Cull Potatoes Alfalfa
Average Initial Weight	Lbs.	63.4	64.4
Average Final Weight	Lbs.	81.6	83.7
Average Total Gain	Lbs.	18.2	19.3
Feed Required for 100 Lbs. Gain			
Peafield	Acres	.81	.97
Alfalfa	Lbs.	825.0	1145.0
Cull Potatoes	Lbs.	365.9	232.0
Cost of 100 Pounds Gain		$16.69	$14.88
Death Loss	Total	1	0
Average Death Loss		.5	.0

Discussion of Results

Table No. XIV shows a comparison of the methods of pasturing and herding of lambs on the peafield, when both were supplemented with cull potatoes and alfalfa. Lambs pastured on the peafield and fed cull potatoes and alfalfa in the corral produced 1.1 pounds or 5.7 percent greater gains than did those herded and fed the same supplementary feeds. In comparing the feed required for 100 pounds of gain, we find the pastured lambs required .16 of an acre more peas and 320 pounds more alfalfa but required 134 pounds less potatoes than did the lambs herded on peas. In comparing the costs of 100 pounds of gain we find that the herding method of feeding field peas shows $1.81 or 10.8 percent greater cost than does the pasturing method.

Judging from the low losses obtained from these two rations, it would seem that they were quite effective in checking the death losses among pea fed lambs.

TABLE NO. XV

GAINS MADE BY LAMBS, HERDED ON PEAFIELD AS COMPARED TO GAINS ON PEAS, HERDED WITH GROUND BARLEY

1922-23

Table Based on One Average Lamb

Ration Fed		Peas, Herded	Peas, Herded Ground Barley
Average Initial Weight	Lbs.	57.1	57.1
Average Final Weight	Lbs.	67.0	72.1
Average Total Gain	Lbs.	9.9	15.0
Feed Required for 100 Lbs. Gain	*		
Cost of 100 Lbs. Gain	*		
Death Loss	Total	4	8

*No Record.

Discussion of Results

The addition of barley to a ration of peas, herded, increased the gains on lambs 5.1 pounds or 34 percent as compared with gains secured by the ration of peas, herded, alone. The death loss was increased 50 percent in the barley fed lot, indicating that a high carbonaceous feed tends to increase losses.

TABLE NO. XVI

GAINS MADE BY LAMBS ON PEAS, HERDED, AND OAT HAY AS COMPARED TO GAINS ON PEAS, HERDED, OAT HAY, AND BARLEY WHEN BOTH ARE SUPPLEMENTED WITH CULL POTATOES AND ALFALFA

1923-24

Table Based on One Average Lamb

Original Ration Fed		Peas, Herded Oat Hay	Peas, Herded Oat Hay Barley
Supplementary Ration Fed		Cull Potatoes Alfalfa	Cull Potatoes Alfalfa
Average Initial Weight	Lbs.	54.6	55.6
Average Final Weight	Lbs.	74.1	80.2
Average Total Gain	Lbs.	19.5	24.6
Feed Required for 100 Lbs. Gain			
Peafield	Acres	1.29	.76
Oat Hay	Lbs.	1071.5	792.6
Barley	Lbs.		538.4
Cull Potatoes	Lbs.	297.0	297.8
Alfalfa	Lbs.	565.8	395.8
Cost of 100 Lbs. Gain		$24.69	$24.06
Death Loss	Total	12.0	15.0

Discussion of Results

The addition of barley to a ration of peas, herded, and oat hay and supplemented with cull potatoes and alfalfa increased the gains 5.1 pounds as compared with the same ration without the barley. A comparison of the feed required for 100 pounds of gain shows that 538.4 pounds of barley replaced .53 acres of peas, 278.9 pounds of oat hay, and 70 pounds of alfalfa. Both lots consumed the same amounts of cull potatoes. The costs of 100 pounds of gain did not vary as much as did the gains. The barley ration cost $0.63 less for 100 pounds gain than did the same ration without the barley. Although the cull potatoes and alfalfa were not fed during the entire feeding period, they were fed the same number of days in each lot and under the same conditions.

The losses among lambs on these rations were the heaviest experienced in any of the feeding tests. However, the losses were checked when cull potatoes and alfalfa were added to the original ration. Thus, it would seem that cull potatoes and alfalfa had a decided effect in controlling losses.

TABLE NO. XVII

GAINS MADE BY LAMBS PASTURED ON PEAS AS COMPARED TO GAINS ON PEAS, PASTURED, SHELLED CORN AND ALFALFA - 1926-27

Table Based on One Average Lamb

Ration Fed		: Peas, Pastured	: Peas, Pastured Shelled Corn Alfalfa
Average Initial Weight	Lbs.	: 69.1	: 70.5
Average Final Weight	Lbs.	: 92.1	: 101.3
Average Total Gain	Lbs.	: 23.0	: 30.8
Feed Required for 100 Lbs Gain		:	
Peafield	Acres	: .74	: .41
Shelled Corn	Lbs.		256.9
Alfalfa	Lbs.	:	: 300.6
Cost of 100 Lbs. Gain		: $9.95	: $11.93
Death Loss	Total	: 6	: 6

Discussion of Results

Although, corn cannot be grown in the San Luis Valley, because of the short growing season, it has been possible to ship it into the valley at the same cost as in Northern Colorado. In these tests, the addition of corn and alfalfa to a peafield ration produced 7.8 pounds greater gains per lamb than when peas were pastured without a supplementary feed. The lot fed peas, pastured, shelled corn and alfalfa required 0.41 acres of peas, 256.9 pounds of corn, and 300.6 pounds of alfalfa for 100 pounds gain as compared with .74 acres of peas, when no other feed was fed. However, the cost was $1.98 or 16.6 percent greater per lamb for the lot fed shelled corn and alfalfa with peas, pastured.

TABLE NO. XVIII

GAINS MADE BY LAMBS ON A RATION OF PEAS, PASTURED AS COMPARED TO GAINS ON PEAS, PASTURED, WITH A MINERAL MIXTURE - 1926-27

Table Based on One Average Lamb

Ration Fed		Peas, Pastured	Peas, Pastured Mineral Mixture
Average Initial Weight	Lbs.	69.1	66.8
Average Final Weight	Lbs.	92.1	93.6
Average Total Gain	Lbs.	23.0	26.8
Feed Required for 100 Lbs. Gain			
Peafield	Acres	.74	.82
Mineral Mixture	Lbs.		16.3
Cost of 100 Lbs. Gain		$9.95	$11.39
Death Loss	Total	6	9

Discussion of Results

A simple mineral mixture composed of 40 parts of hardwood ashes, 40 parts of bone meal, and 20 parts of common salt proved effective in increasing gains, when added to the ration of peas, pastured. The gains for the mineral fed lot were 3.8 pounds or 14.2 percent higher than those for the peas, pastured, ration. The mineral fed lot required 16.3 pounds of mineral mixture and .08 acres more peas for 100 pounds gain than did the lot fed on pastured peas alone. Comparing the cost of feed required for 100 pounds of gain we find that the lambs fed peas, pastured, show a $1.44 or 12.6 percent greater cost than does the mineral fed lambs.

The death loss was increased in the mineral fed lot, which would indicate that the mineral mixture did not lower the losses and probably was responsible for the increased death rate.

GENERAL CONCLUSIONS

1. Pasturing of lambs on peafield produced 41.8 percent greater gains than herding and 47.5 percent higher gains than the feeding of pea hay. The death loss resulting from the pasturing method was 54.5 greater than herding and 36.3 percent higher than the feeding of pea hay. The increased death loss resulting from this method would make pasturing appear unprofitable.

2. Lambs fed a ration of peas, herded, with wheat straw made 6.9 percent greater gains than did those herded on peafield alone.

3. The addition of cull potatoes to a ration of peas, herded, and alfalfa increased the gains 4.5 pounds per lamb and lowered the cost of 100 pounds of gain $6.20. Each ton of potatoes fed replaced .39 acres of peas but there was required 305.3 pounds more alfalfa for 100 pounds gain. The cull potatoes showed a feed replacement value of $3.42 per ton.

4. Lambs fed a ration of peas, pastured, with cull potatoes and alfalfa required .16 acres more peas and 320 pounds more alfalfa but required 134 pounds less of cull potatoes than did the same ration with the peas, herded. The peas, pastured, ration produced 1.1 pounds less gain but cost $1.81 less for 100 pounds of gain than did the peas, herded, ration.

5. Ground barley when added to a ration of peas, herded, proved effective in producing 5.1 pounds greater gains than

did a peas, herded, ration.

6. Barley added to a ration of peas, herded, and oat hay with cull potatoes and alfalfa fed a limited time, produced 5.1 pounds greater gain on lambs and the cost was reduced $0.63 per 100 pounds gain.

7. Lambs fed a ration of peas, pastured, shelled corn and alfalfa produced 7.8 pounds greater gain than did those pastured on peafield alone. The cost for 100 pounds of gain was $1.98 higher for the shelled corn lot.

8. The addition of a simple mineral mixture to a ration of peas, pastured, produced 3.8 pounds greater gains but cost $1.44 more per 100 pounds gain.

9. A windbreak proved effective in producing 3.3 pounds greater gain per lamb and saved $1.06 per 100 pounds gain than did the unprotected lot. The sheltered lot required .05 acres less peas, 76.4 pounds less alfalfa, and 30.2 pounds less shelled corn than did the unprotected lot per 100 pounds gain. According to the market report the sheltered lot returned $0.66 more profit than did the unprotected lot[14].

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