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Bulletin No. 107 - Swine Feeding

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UNIVERSITY OF WYOMING

AGRICULTURAL
EXPERIMENT STATION

LARAMIE, WYOMING

BULLETIN NO. 107
SEPTEMBER 1915

SWINE FEEDING

I. (a) Pea Pasture for Fattening Pigs.
(b) Hurdling Pea Pasture for Pigs.

II. (a) Alfalfa Tea for Growing Pigs.
(b) Corn Meal vs. Barley Meal for Fattening Pigs.

III. (a) Pea Hay vs. Alfalfa Hay for Brood Sows.
(b) Alfalfa Meal in Fattening Rations for Sows.

A. D. Faville

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CONCLUSIONS.

Pea pasture gave good returns in fattening rations. ........................................ Pages 18-19.

Hurdling pea pasture effected a large saving of peas. ........................................ Pages 18-19.

Pigs that had been on pasture previously made better gains when put on dry feed than did pigs that had had no pasture. ........................................ Page 20.

Returns from an acre of pea pasture were good. ........................................ Page 21.

Cross-bred and pure-bred pigs made practically the same gains. ........................ Page 21.

Alfalfa tea added to a ration increased gains though it did not appear to be of much value. ........ Pages 23-24.

Barley meal proved equal to corn meal for young fattening pigs. ........................ Page 25.

Alfalfa hay gave better returns in maintenance rations for brood sows than did pea hay. ........ Page 26.

A mixture consisting of four parts corn meal and one part alfalfa meal proved less satisfactory as a fattening ration for brood sows than did corn meal alone. Page 27.
Ration Experiments With Swine.

INTRODUCTION.

Pork production is not receiving the attention within our state that the industry merits and farmers are slow in utilizing the pig to convert their crops into a concentrated, readily marketed, product. Work along lines similar to those outlined in Bul. 96 has been continued with the idea of adding material to that already collected relative to the possibilities of swine raising in Wyoming, for pasture crops and home-grown feeds must be considered in the formulating of cheap rations.

Statements of results have been condensed as much as possible and the whole bulletin has been shortened with the idea of making it more readable for the average individual. Feeding was done and records were kept by R. P. Allen, who did his work in a careful, painstaking manner.

PART 1.

(a) PEA PASTURE FOR FATTENING PIGS.
(b) HURDLING PEA PASTURE FOR PIGS.

OUTLINE OF EXPERIMENT.

No attempt will be made in the discussion of this experiment to arrange results under headings (a) and (b), as the tables may be readily split up if so desired.

Twenty-one thrifty shoats were carefully divided into three lots. There were both grade and pure-bred Duroc-Jerseys in each lot; the grades were three-fourths Duroc and one-fourth Tamworth, all of the pigs being out of the same Duroc boar. The 10 grades were from one litter, while the others were from different sows. Each lot had one rather small animal. Lot I had 4 grades and 3 pure-breds; Lots II and III, 3 grades and 4 pure-breds.
The peas were a fair stand. At the beginning of the experiment, October 12th, the vines were dead. Most of the pods were well filled. The peas for Lot I were hurdled off so that the pigs had access to fresh vines at short intervals. Lot II was given the run of its entire field and Lot III on dry feed had a yard no larger than was needed for exercise. An attempt was made to see whether it would pay to hurdle off a pea field rather than to allow the pigs to run at large.

Small V-shaped portable houses furnished shelter for the lots on pasture and were found very satisfactory. Severe winter weather with a good deal of snow was experienced before the close of the experiment on February 1st, yet the pigs seemed to suffer little from the cold. Whenever there was a chance for them to get out they would be found working over the pea vines. Lot I cleaned up the peas a trifle better, though Lot II did its work well.

Each of the pasture lots containing 1.47 acres furnished grazing for 7 pigs for 112 days, the pigs being on a half grain ration.

At the close of the 16 weeks both pea lots were taken in and put on a full grain ration similar to that received by Lot III. This was done with the idea of determining the residual effect of the pastures.

An analysis of the feeds used in all experiments will be found in the back of this bulletin.
RESULTS.

Lot I on grain and pea pasture, hurdled.
Lot II on grain and pea pasture, not hurdled.
Lot III on grain alone.

Table B shows the weights and gains of the pigs during the 16 weeks that Lots I and II were on pasture.

**TABLE “B.” AVERAGE WEIGHTS AND GAINS OF PIGS. (112 DAYS).**

<table>
<thead>
<tr>
<th>LOT</th>
<th>Av. wt. at beginning lbs.</th>
<th>Av. wt. at close lbs.</th>
<th>Av. gain lbs.</th>
<th>Average daily gain lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Peas, hurdled</td>
<td>65</td>
<td>174</td>
<td>109</td>
<td>.97</td>
</tr>
<tr>
<td>II. Peas, not hurdled</td>
<td>67.3</td>
<td>157.3</td>
<td>90</td>
<td>.80</td>
</tr>
<tr>
<td>III. No peas</td>
<td>68.4</td>
<td>156.9</td>
<td>88.5</td>
<td>.79</td>
</tr>
</tbody>
</table>

Lots I and II, receiving pea pasture and half the grain ration given Lot III, made better gains. In comparing the first two lots we found that hurdling the peas apparently gave much better results.

**TABLE “C” TOTAL AND DAILY GRAIN RATION. (112 DAYS).**

<table>
<thead>
<tr>
<th>LOT</th>
<th>Corn 2 parts</th>
<th>Middlings 1 part</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total grain per head lbs.</td>
<td>Daily grain per head lbs.</td>
</tr>
<tr>
<td>I. Peas, hurdled</td>
<td>272.</td>
<td>2.4</td>
</tr>
<tr>
<td>II. Peas, not hurdled</td>
<td>272.</td>
<td>2.4</td>
</tr>
<tr>
<td>III. No Peas</td>
<td>544.</td>
<td>4.8</td>
</tr>
</tbody>
</table>

The average weight of the pigs was approximately 115 pounds. The plan followed was to keep Lot III eating as much as possible while the other two lots received one-half the amount Lot III consumed.
During the worst of the weather the pigs on pasture did very little foraging, hence gains were probably somewhat slower and pasture returns not quite as large as they would have been under milder climatic conditions.

**TABLE “D.” GRAIN FOR 100 POUNDS GAIN.**

<table>
<thead>
<tr>
<th>LOT</th>
<th>Corn lbs.</th>
<th>Middlings lbs.</th>
<th>Total grain lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Peas, hurdled</td>
<td>167</td>
<td>83</td>
<td>250</td>
</tr>
<tr>
<td>II. Peas, not hurdled</td>
<td>201</td>
<td>101</td>
<td>302</td>
</tr>
<tr>
<td>III. No peas</td>
<td>410</td>
<td>208</td>
<td>615</td>
</tr>
</tbody>
</table>

Both pasture lots required a much smaller grain allowance for a given gain than did Lot III which received only grain.

365 pounds or approximately 59% less grain was required for 100 pounds gain when pea pasture, hurdled, replaced half the grain ration.

313 pounds or approximately 51% less grain was required for 100 pounds gain when pea pasture, not hurdled, replaced half the grain ration.

Comparing Lots I and II we find that 52 pounds or approximately 17% less grain was required for 100 pounds gain when the pea pasture was hurdled.

Working out the pasture results from the previous tables it will be found that 1.47 acres of pea pasture hurdled made a direct saving of 2788 pounds of grain and 1.47 acres of pasture not hurdled saved 1970 pounds of grain. One acre of hurdled pasture saved 1897 pounds of grain while one acre of the pasture not hurdled saved 1340 pounds.

Residual pasture effects must be estimated before complete returns are given. Results reported in the next section throw light on this subject.
RESULTS.

Each Lot on a Full Ration No Pasture.

At the close of the pasture experiment Lots I and II were brought in and placed on a full grain ration similar to the mixture they had been receiving. Results condensed as much as possible are shown in Table E.

TABLE "E." ALL LOTS ON DRY FEEDS. (56 DAYS).

<table>
<thead>
<tr>
<th>LOT</th>
<th>Av. daily gain per pig lbs.</th>
<th>Av. daily grain per pig lbs.</th>
<th>Grain for 100 lbs. gain lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>1.37</td>
<td>6.75</td>
<td>494</td>
</tr>
<tr>
<td>II.</td>
<td>1.28</td>
<td>6.13</td>
<td>479</td>
</tr>
<tr>
<td>III.</td>
<td>1.04</td>
<td>5.66</td>
<td>546</td>
</tr>
</tbody>
</table>

It will be seen at once that both pasture lots made considerably better gains than did Lot III which had been on dry feed continuously. That their appetites were better is shown by the fact that their daily grain rations were heavier. And yet taking this into consideration we find grain requirements for 100 pounds gain lower with Lots I and II than they were with the lot that had not been on pasture. The better showing made by the first two lots should be credited to the residual effect of the pasture. Crediting this saving to the pasture account of each lot the residual saving for lot 1 was 278 pounds and for Lot II 335 pounds. The total amounts that may be credited to the pasture are as follows:

1.47 acres pea pasture hurdled, (Lot 1) saved 3066 pounds mixed grain.

1.47 acres pea pasture not hurdled (Lot II), saved 2305 pounds mixed grain.

Stated with one acre as the unit:
Lot I, 1 acre saved 2086 pounds grain.
Lot II, 1 acre saved 1568 pounds grain.

Pea pasture is certainly a valuable aid in the production of cheap pork, and the financial returns from an acre are good.* Hurdling the peas effected a saving equivalent to 518 pounds of grain per acre.

A COMPARISON OF THE GRADE AND PURE-BRED PIGS.

The grade and pure-bred pigs in the pasture experiments, bred and divided as outlined on page 16, were weighed separately throughout the trials. Individual records of the feed eaten were not kept but the figures showing weights and gains may be of interest.

TABLE "F." GRADE VS. PURE-BRED PIGS.

<table>
<thead>
<tr>
<th></th>
<th>10 Cross-breds</th>
<th>11 Pure-breds</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Two lots on posture. One lot on dry feed.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average weight when put on pasture</td>
<td>54.2</td>
<td>78.5</td>
</tr>
<tr>
<td>Average weight at end 112 days</td>
<td>149.8</td>
<td>174.4</td>
</tr>
<tr>
<td>Average gain</td>
<td>95.6</td>
<td>95.9</td>
</tr>
<tr>
<td>(All lots on dry feed.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average weight at end of next 56 days</td>
<td>218.6</td>
<td>244.3</td>
</tr>
<tr>
<td>Average gain</td>
<td>68.8</td>
<td>69.6</td>
</tr>
<tr>
<td>Average total gain, 168 days</td>
<td>164.4</td>
<td>165.8</td>
</tr>
</tbody>
</table>

The ten cross-bred pigs divided as follows: four in Lot I and three in Lots II and III, gained an average of 164.4 pounds apiece, while the eleven pure-breds, three of which were in Lot I and four in each of the Lots II and III, gained 165.8 pounds apiece. Both while on pasture and on dry feed, gains made by the two classes were practically the same.

*See Wyo. Bul. 96 for additional data.
PART II.

(a) **ALFALFA TEA FOR GROWING PIGS.**

Outline of Experiment.

Eight late spring pigs, seven of them cross-breds and one pure-bred, were divided as carefully as possible into two lots of four each. The cross-breds were three-fourths Duroc-Jersey and one-fourth Tamworth, while the pure-bred was a Duroc-Jersey. Lot I contained the pure-bred.

The grain ration consisted of a mixture of one part corn meal and one part middlings. For Lot I this feed was mixed with water before feeding, while with Lot II alfalfa tea replaced the water. Alfalfa tea was made by mixing meal and cold water together then allowing the combination to stand from one feeding period to the next. When ready for use the water was strained off thru two thicknesses of cheese cloth and added to the grain allowance.

An analysis of the tea will be found in the back of the bulletin. About three pounds of meal and twenty pounds of water was used in the preparation of each feed. Both lots had good shelter and yards large enough to furnish needed exercise.

The experiment opened November 16th and was continued 168 days.

### TABLE "G." DIVISION MADE AND FEED USED.

<table>
<thead>
<tr>
<th>LOT</th>
<th>No. in lot</th>
<th>Av. weight at beginning, lbs.</th>
<th>Feed Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>4</td>
<td>36.8</td>
<td>Grain mixed with water.</td>
</tr>
<tr>
<td>II</td>
<td>4</td>
<td>37.3</td>
<td>Grain mixed with alfalfa tea.</td>
</tr>
</tbody>
</table>
TABLE "H." WEIGHTS AND GAINS. (168 days.)

<table>
<thead>
<tr>
<th>LOT</th>
<th>Av. weight at beginning lbs.</th>
<th>Av. weight at close lbs.</th>
<th>Av. total gain lbs.</th>
<th>Av. daily gain lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>36.8</td>
<td>135.0</td>
<td>98.2</td>
<td>.58</td>
</tr>
<tr>
<td>II.</td>
<td>37.3</td>
<td>151.8</td>
<td>114.5</td>
<td>.68</td>
</tr>
</tbody>
</table>

During the 168 days pigs of Lot II receiving the tea gained a trifle over sixteen pounds apiece more than Lot I. It is a question whether this would be enough of a gain to offset the extra cost and work. Gains were rather small with both lots. The pigs seemed to lack a trifle in appetite and general thrift. Lot II, getting the tea, ate somewhat better and had noticeably better coats.

TABLE "I." TOTAL AND DAILY GRAIN RATION. (168 days.)

<table>
<thead>
<tr>
<th>LOT</th>
<th>1 part corn meal, 1 part middlings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total grain per head lbs.</td>
</tr>
<tr>
<td>I.</td>
<td>Grain mixed with water....</td>
</tr>
<tr>
<td>II.</td>
<td>Grain mixed with alfalfa tea</td>
</tr>
</tbody>
</table>

The average weight of the eight pigs during the time they were on experiment was approximately ninety pounds. Both lots received the same amount of grain daily though Lot II would probably have eaten a trifle more.

The grain requirements for one hundred pounds gain are shown in Table "J".
### TABLE “J.” GRAIN FOR 100 POUNDS GAIN.

<table>
<thead>
<tr>
<th>LOT</th>
<th>Corn lbs.</th>
<th>Middlings lbs.</th>
<th>Total grain lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Grain mixed with water</td>
<td>278.5</td>
<td>278.5</td>
<td>557.0</td>
</tr>
<tr>
<td>II. Grain mixed with alfalfa tea</td>
<td>239.</td>
<td>239.0</td>
<td>478.0</td>
</tr>
</tbody>
</table>

Seventy-nine pounds or approximately 14% less grain was required for 100 pounds gain when alfalfa tea was used in the ration. The question comes up as to whether a small amount of the meal itself would not have proven equally satisfactory. While the tea was doubtless of some benefit, was it a product valuable enough to be used in preference to the alfalfa meal itself?

(b) **CORN MEAL VS. BARLEY MEAL FOR FATTENING PIGS.**

**Outline of Experiment.**

At the close of the test of alfalfa tea the eight pigs used in the experiment were divided into two lots in such a way that both of the new lots had two of the pigs from each old. Lot I averaged 146.8 pounds in weight and Lot II 140 pounds.

The grain rations were made up as follows:

- **Lot I.** Corn meal, 4 parts.
  Alfalfa meal, 1 part.

- **Lot II.** Barley meal, 4 parts.
  Alfalfa meal, 1 part.

A condensed statement of the results of the 56 day feeding period is given in Table “K.”
TABLE "K." CONDENSED RESULTS. CORN VS. BARLEY. (56 Days).

<table>
<thead>
<tr>
<th>LOT</th>
<th>Av. daily gain per pig lbs.</th>
<th>Av. daily grain per pig lbs.</th>
<th>Feed for 100 lbs. gain, lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>1.02</td>
<td>4.9</td>
<td>486</td>
</tr>
<tr>
<td>II.</td>
<td>.98</td>
<td>4.9</td>
<td>500</td>
</tr>
</tbody>
</table>

Making allowance for the fact that one animal in Lot II. was sick for two weeks, we are safe in assuming that barley meal was as satisfactory a pig feed as corn meal. Weights were kept of the sick pig, hence the assumption made is one borne out by figures. The returns as given show but little difference in the two concentrates.

PART III.

(a) PEA HAY VS. ALFALFA HAY FOR BROOD SOWS.

Outline of Experiment.

Six station brood sows were divided into two lots and put on rations planned with the idea of testing out the value of alfalfa and pea hay. The test began Nov. 18th and was continued for ninety-one days.

TABLE "L." DIVISIONS MADE AND FEED USED.

<table>
<thead>
<tr>
<th>LOT</th>
<th>No. in lot</th>
<th>Av. weight at beginning lbs.</th>
<th>Feed used</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>3</td>
<td>254</td>
<td>Grain and alfalfa hay.</td>
</tr>
<tr>
<td>II.</td>
<td>3</td>
<td>270</td>
<td>Grain and pea hay.</td>
</tr>
</tbody>
</table>

The hay was fed in racks through the sides of which the pigs could get their noses. There was almost no waste. The grain mixture consisted of two parts of
corn meal and one part middlings fed as a slop.

Small gains were desired as the pigs were rather thin when the experiment opened.

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

**Results.**

**TABLE “M.” WEIGHTS AND GAINS. (91 days.)**

<table>
<thead>
<tr>
<th>LOT</th>
<th>Av. wt. at beginning lbs.</th>
<th>Av. wt. at close gain lbs.</th>
<th>Av. total gain, lbs.</th>
<th>Av. daily gain, lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Alfalfa hay...</td>
<td>254</td>
<td>303</td>
<td>49.</td>
<td>.54</td>
</tr>
<tr>
<td>II. Pea vine hay..</td>
<td>270</td>
<td>309</td>
<td>39.</td>
<td>.43</td>
</tr>
</tbody>
</table>

The average daily ration per pig was as follows:
Lot I. Grain 3.6 pounds, alfalfa hay 1.9 pounds.
Lot II. Grain 3.6 pounds, pea hay 1.9 pounds.

The average weight of the pigs for ninety-one days, was 286 pounds.

The pea hay was fair in quality though the vines were not heavily loaded with pods. Both lots made satisfactory gains and kept in good breeding condition. As will be seen by a study of the above table, alfalfa hay proved to be somewhat better.

The past year’s work with maintenance rations again brings out the point that the Wolff-Lehmann standards are too high.

(b) **ALFALFA MEAL IN FATTENING RATIONS FOR BROOD SOWS.**

**Outline of Experiment.**

It seemed wise to dispose of several of the brood sows so plans were laid to test the value of alfalfa meal in their fattening rations. Only five animals were available for the work and no very satisfactory lot divisions could be worked out. Lot I., receiving straight corn meal, contained two and Lot II., getting four parts corn meal and one part alfalfal meal, had three animals. Both lots were in condition to make rapid gains. Table “N” summarizes the results of this test.
Ration Experiments With Swine.

TABLE “N.” ALFALFA MEAL RESULTS SUMMARIZED. (42 Days).

<table>
<thead>
<tr>
<th>LOT</th>
<th>Av. daily gain lbs.</th>
<th>Av. daily ration s.</th>
<th>Feed for 100 lbs. gain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Corn meal lbs.</td>
</tr>
<tr>
<td>I</td>
<td>2.9</td>
<td>11.9</td>
<td>410</td>
</tr>
<tr>
<td>II</td>
<td>2.1</td>
<td>10.2</td>
<td>389</td>
</tr>
</tbody>
</table>

Both lots made heavy gains on low feed requirements. The 97 pounds of alfalfa meal fed to each animal of Lot II. in producing 100 pounds gain replaced 21 pounds of corn meal used by Lot I.

With lots as small and irregular as were these it would not be fair to attempt detailed comparisons. Individuality is too strong a factor in both lots.

ACKNOWLEDGMENTS.

The writer wishes to acknowledge his indebtedness to Mr. F. E. Hepner and to Mr. E. N. Roberts, Assistant Station Chemists, for the analyses of feed tested in the foregoing experiments.

TABLE “O.” CHEMICAL COMPOSITIONS OF FEEDS.

<table>
<thead>
<tr>
<th>FEED</th>
<th>Percentage composition air dry substance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water</td>
</tr>
<tr>
<td>Alfalfa meal</td>
<td>7.05</td>
</tr>
<tr>
<td>Barley meal</td>
<td>9.93</td>
</tr>
<tr>
<td>Corn meal...</td>
<td>10.03</td>
</tr>
<tr>
<td>Middlings..</td>
<td>10.32</td>
</tr>
<tr>
<td>Alfalfa tea.</td>
<td>98.</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>6.14</td>
</tr>
<tr>
<td>Pea hay....</td>
<td>6.21</td>
</tr>
</tbody>
</table>