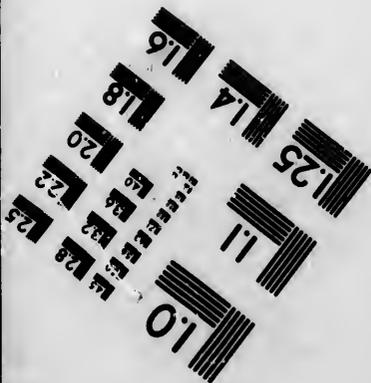
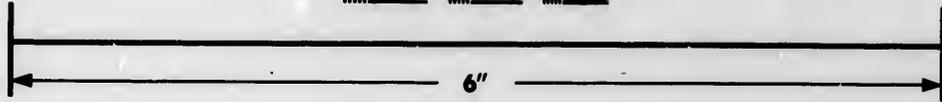
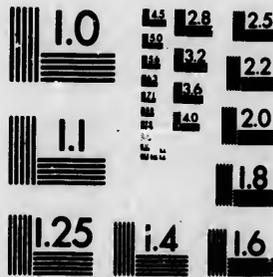


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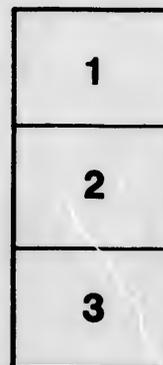
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ONTARIO AGRICULTURAL COLLEGE
EXPERIMENT STATION

BULLETIN LXIV

ENSILAGE AND ROOTS FOR SWINE

BY THOMAS SHAW, PROFESSOR OF AGRICULTURE.

PUBLISHED BY THE DEPARTMENT OF AGRICULTURE
May 28, 1891

TORONTO

PRINTED BY WARWICK & SONS

BULLETIN LXIV

ENSILAGE AND ROOTS AS FOOD FACTORS IN SWINE FEEDING

This experiment began on December 4th, 1890 and closed on March 4th, 1891, covering a period of 90 days. The after experiment growing out of it lasted 47 days. Its primary object was the same as that of the experiment the results of which are given in Bulletin LIV, issued October 1st, 1890, viz. to ascertain the value both essentially and relatively of corn ensilage and roots, when used as food adjuncts in feeding swine in the winter season. A second object was to ascertain the cost of making pork at the current market values of the food and pork respectively. A third object was to demonstrate the extent of the loss from feeding swine after they have become fit for slaughter. Several other facts of much interest were brought out in the experiment, as the profits arising from the judicious feeding of swine, the losses arising from feeding them injudiciously, and the influence of corn ensilage and roots respectively on development during the subsequent fattening period.

THE ANIMALS SELECTED. The animals chosen for the experiment were all sired by the same pure-bred Berkshire boar and bred on the farm. They were divided into three groups, each consisting of three animals, one barrow and two sows. Eight of the nine were the offspring of a high grade Berkshire sow, and were 209 days old at the commencement of the experiment. The ninth was also from a sow of similar breeding, and was farrowed about the same time as the litter already mentioned. They were all in good store condition at the commencement of the experiment. The conditions therefore were very similar.

PERIOD OF PREPARATION. Two weeks prior to the commencement of the experiment the pigs in the different groups were put in separate pens, 6 ft. by 10 ft., which was all the room available. They were then fed on the respective rations given to them during the experiment, the object of which was to accustom them to the new diet. Before they were selected for the experiment they had been fed on a meal ration more or less varied and refuse from the College.

FOOD AND FEEDING. The pigs in group 1 were fed all the meal they would eat up clean. They took 14 lb. per day until within ten days of the close of the experiment, when they would eat no more than 10 lb. per day. Those in group 2 were fed about half as much meal as the pigs in group 1, and in addition all the refuse they would eat without waste. They were given 40 lb. per day until within 28 days of the close of the experiment, when they were given 45 lb. per day. The pigs in group 3 were also given about one-

half as much meal as those in group 1, and in addition all the corn ensilage virtually that they could utilise. They took 20 lb. of the ensilage per day until within 15 days of the close of the experiment, when the quantity was increased to 25 lb. per day. The aim was to make the quantities of meal given to the pigs in groups 2 and 3 respectively exactly one-half the amount given to the pigs in group 1, but a slight variation was caused by the reduction already noted in the quantity of meal given to the pigs in group 1. The meal ration given was the same in kind throughout and in each instance, and was also similar in kind to that used in the corresponding experiment of the previous year. It consisted of ground oats, ground barley, ground pease and wheat middlings, in the proportions by weight of 1, 1, 2 and 1 respectively. The food was given in three feeds per day. In feeding, water was first poured into the trough in each instance. To the pigs in group 1 the meal was then given; to those in group 2 the turnips, followed by the meal; and to those in group 3 the ensilage followed by the meal. The ensilage was cut into lengths of about $1\frac{1}{2}$ inches. The quality was not the best, as the corn had scarcely become sufficiently matured when it had to be cut. The pigs only ate the more succulent portions of the ensilage, the other portions were simply chewed. The pigs in group 1 required water additional to that given them along with the food.

ESTIMATED VALUE OF THE FOOD. The various components of the meal ration were estimated at current market values in Guelph, viz.: oats, 38 cents; barley, for feeding purposes, 45 cents; pease, 58 cents per bushel; and wheat middlings, \$15 per ton. Eight cents per 100 lb. was allowed for grinding the meal. The price of the meal mixture used was, therefore, practically one cent per pound, which was one-eighth of a cent more per pound than in the experiment of the previous year. The roots were charged at eight cents per bushel as in the experiment of the previous year; but the corn ensilage, which in that experiment was given a value of \$2.50 per ton, was in this one put at \$2 per ton, as in our experience in growing corn since the time we have found that it can be grown for a less sum than the price then fixed upon.

FOOD EATEN. Table 1 gives the food consumed (1) by each individual animal daily on an average throughout the experiment and (2) the whole amount consumed by the pigs in each group:

	Group 1.	Group 2.	Group 3.
	lb.	lb.	lb.
By each animal....	4.53 meal.	{ 2.30 meal. 13.73 turnips.	{ 2.30 meal. 6.93 ensilage.
By each group....	1,224 meal.	{ 621 meal. 3,708 turnips.	{ 621 meal. 1,872 ensilage.

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WEIGHTS. Table II gives (1) the total weight of each group at the commencement of the experiment, and (b) at the close, (2) increase in weight of each group, (3) the average daily increase of each group, (4) the average individual increase of each group, and (5) the average individual daily increase of each group :

	Group 1.	Group 2.	Group 3.
	lb.	lb.	lb.
Weight at commencement.....	465.0	442.5	472.0
Weight at close.....	728.0	606.0	543.0
Increase per group....	263.0	163.5	71.0
Average daily increase per group....	2.922	1.817	.789
Average individual increase... ..	87.667	54.500	23.667
Average individual daily increase	.974	.606	.263

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VALUES. Table III gives (1) the value of the animals in each group at the commencement of the experiment, (2) the market value of the food consumed, (3) the total value of the animals and food, (4) the value of the animals at the close of the experiment, (5) the increase or decrease in value of the animals at the close of the experiment, as compared with their value at the commencement, (6) the value of the food fed added, and (6) the average gain or loss per cent. on the investment :

	Group 1.	Group 2.	Group 3.
	\$ c.	\$ c.	\$ c.
Value at commencement.....	17 44	16 59	17 70
Cost of food.....	12 21	11 15	8 08
Total cost of animals and food...	29 68	27 74	25 78
Value at close	32 76	25 15	21 72
Gain or loss (-)	3 08	-2 59	-4 06
Gain or loss per cent. on investment..	10 38	-9 34	-15 75

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Group 3.
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621 meal.
,872 ensilage.

The pigs were all valued at \$3.75 per hundred pounds live weight at commencement of the experiment, as this was the price given in Guelph market at the time. At its close the pigs in group 1 were valued at \$4.50 per hundred, the market price in the same place at the time. Those in group 2, which were not in prime condition, were valued at \$4.15 per hundred, and as those in group 3 were not much

improved in condition they were valued at \$4 per hundred. The price of pork had advanced in the interval; hence they were rated a little higher than at the commencement of the experiment.

THE AFTER EXPERIMENT. An after experiment was then commenced March 4 and continued until April 20th, a period of 47 days. Its objects were threefold, viz: to ascertain (1) the results from feeding pigs on a meal ration after they are ready for market; how those results compare with the results obtained from fattening pigs for a similar period and on a similar ration, which had been as those in groups 2 and 3 of the experiment; and (3) the comparative gain or loss from fattening pigs on meal alone, as compared with feeding them on a ration of meal and turnips in one instance and meal and ensilage in another, and then finishing them on a ration of meal. The respective groups were the same as in the experiment. They were all fed on meal similar to that used in the experiment. They were given practically all they would eat; but while those in groups 2 and 3 took about the same quantity they each consumed much more than those in group 1.

FOOD EATEN. Table IV gives the amount of food consumed during the after experiment, arranged as in table No. 1.

	Group 1.	Group 2.	Group 3.
	lb. meal.	lb. meal.	lb. meal.
By each animal daily	3.07	6.14	6.14
By each group in period	433.	866.	866.

WEIGHTS. Table V gives the weights during the after experiment, arranged as in table II:

	Group 1.	Group 2.	Group 3.
	lb.	lb.	lb.
Weight at commencement.....	728.	606.	543.
Weight at close.....	757.	737.	763.
Increase per group.....	29.	131.	220.
Average daily increase per group....	0.617	2.787	4.681
Average individual increase.....	9.667	43.667	73.333
Average individual daily increase....	0.206	.929	1.560

VALUES. Table VI gives the values during the after experiment arranged as in Table III :

	Group 1.	Group 2.	Group 3.
	\$ c.	\$ c.	\$ c.
Value at commencement	32 76	25 15	21 72
Cost of food.....	4 33	8 66	8 66
Total cost of animals and food...	37 09	33 81	30 38
Value at close	34 06	33 16	34 33
Gain or loss	-3 03	-0 65	3 95
Gain or loss per cent. on investment .	-8 17	-1 92	13 00

At the close of the after experiment all the animals in the different groups were sold for slaughter at \$4.50 per hundred live weight. The condition of the animals in groups 2 and 3 when sold was prime, and very similar to the condition of the pigs in group 1 at the close of the experiment proper. The weights on each occasion were taken after a fast of fifteen hours.

FINANCIAL SUMMARY. The financial results of the whole test which lasted for 137 days are given below :

	Group 1.	Group 2.	Group 3.
	\$ c.	\$ c.	\$ c.
Value of animals on Dec. 4th, 1890...	17 44	16 59	17 70
Cost of food during experiment.....	12 24	11 15	8 08
Cost of food in after experiment	4 33	8 66	8 66
Total cost of animals and food...	34 01	36 40	34 44
Price realised when sold, April 20, 1891	34 06	33 16	34 33
Gain or loss	0 05	-3 24	-0 11

It will be observed that at the close of the experiment proper on March 4th, 1891, the gain or loss on the experiment was as follows : with group 1 the gain was \$3.08, with group 2 the loss was \$2.59 and with group 3 the loss was \$4.06.

It should be borne in mind that there was a profit on the food produced, as it was charged at market values instead of the cost of production. What this profit would be it would be scarcely possible to estimate correctly.

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Group 2.	Group 3.
	lb.
	543.
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787	4.681
667	73.333
929	1.560

CONCLUSIONS. The following are the more important of the conclusions from the experiment :

1. That in fattening store pigs of the age indicated for 90 days on a meal ration, such as that used in the experiment, the handsome profit of 10.38 per cent. was realised on the investment, the food being charged at market values. Where the food is raised on the farm there would be an additional profit in most instances.

2. That it has not been found profitable to feed store pigs of the age indicated for a lengthened period on a ration, one-half of which is composed of meal similar to that given to the pigs in group 1, the balance being made up of turnips, as in this experiment the loss from feeding such a ration for 90 days was 9.34 per cent. on the investment.

3. That it has not been found profitable to feed store pigs of the ages indicated for a lengthened period on a ration, one-half of which is composed of meal similar to that given to the pigs in group 1, the balance being made up of corn ensilage, as in this experiment the loss from feeding such a ration for 90 days was 15.75 per cent. on the investment.

4. That in fattening pigs of the age indicated for 90 days, it required the daily consumption of 4.53 lb. of meal to produce an average gain of .974 lb. per day.

5. That after pigs have reached that stage in the fattening process when they cease to make a relatively good increase in weight for the food fed, they are then kept at a loss. The extent of the loss in the present instance was very material. With the pigs in group 1 it was no less than 8.17 per cent. on the investment in 47 days. Every 100 lb. of additional weight of pork was made at a cost of \$14.93, while in the experiment proper with the same animals it cost only \$4.65.

6. That in feeding pigs of the ages indicated for a period of 47 days on a ration, one-half of which was meal and the balance turnips in the one case, and corn ensilage in the other, and then subjecting them to a fattening process on a meal ration for 47 days, the influence of the corn ensilage on development during the said period was much more marked than that of the turnips, as in the former instance the average daily gain during the fattening period was 1.560 lb. and in the latter but .929 lb. although the amount of food consumed in each instance was the same.

7. That in this experiment it was found that there was a material profit from the pigs of the groups which were fed for the longer term, which would seem to indicate that pigs should be finished for market at an early age to get the best results.

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