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## Fattening Pigs

J.W. Wilson

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**AGRICULTURAL  
EXPERIMENT STATION**

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**SOUTH DAKOTA  
STATE COLLEGE OF AGRICULTURE  
AND MECHANIC ARTS**

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**DEPARTMENT OF ANIMAL HUSBANDRY**

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**Fattening Pigs**

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**BROOKINGS, SOUTH DAKOTA**

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# FATTENING PIGS

James W. Wilson

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The production of pork is one of the principal industries in the corn-belt. The pig will yield a larger return for the feed consumed than either the sheep or the steer and will make a larger daily gain for his weight than any other animal on the farm.

All animals fatten rapidly when receiving corn as a ration on account of its highly carbonaceous nature. But the question is often asked by farmers who are practicing dairying to a greater or less extent, what is the value of skim milk and buttermilk for the pig when fed in conjunction with corn?

The Thirteenth Census Report of the United States shows that there has been an increase of 193.4 per cent in the swine industry in South Dakota during the past ten years. There has also been a large increase in the number of dairy cows in the state during this time. This increase can justly be attributed to the prevailing high prices of dairy products, the influx of new settlers from dairying and corn-producing states, and the gradual extension of the corn-belt northward. Dairying and pork production go hand in hand, since the by-products of the creamery are unexcelled, when accessibility is considered, as a feed to increase the returns from a bushel of corn when fed to pigs.

Skim milk and buttermilk are considered in some places as waste products, but when fed in the proper quantity to pigs less grain is required for the production of a pound of gain than when corn is fed alone. Henry of the Wisconsin Experiment Station, after many trials, concludes that for the best results not over three pounds of skim milk should be fed with one pound of corn meal, and that when more than this quantity is given the feeding value of the milk is not obtained.

Skim milk and buttermilk are similar in composition, both being proteinaceous and highly digestible. Experiments show that when feeds of this nature are fed in conjunction with our

highly carbonaceous grains to pigs, the gains are more rapidly made and as a rule are cheaper than when they receive the corn alone.

The market in this state for fat hogs is as good as one could wish, as part are shipped to eastern points and part to Pacific coast points. The breeds raised are principally those of American origin, the Poland-China, Duroc-Jersey and Chester-White, although there are a few herds of the English breeds such as Berkshire and Yorkshire. All seem to do well and are suited to our conditions. However, the breed is only a small part of the success to be obtained in the economical production of pork, as much more depends on the nature of the feeds and the feeder. The hog requires a variety of feeds, with good pasture in the summer and warm sheltered quarters where it can get plenty of exercise, in the winter.

Experiments at this Station show that hogs do not make as large gains during cold as they do during mild weather, hence there is an advantage in forcing the pig and putting him on the market at an early date. The use of the hand separator on the farm renders skim milk, from a feeder's standpoint, more valuable than formerly, when the whole milk was taken to the creamery for separation. This is because it is more uniform in quality and there is less danger of contamination from disease, as milk furnishes one of the best medias for the growth of germs.

Henry of the Wisconsin Experiment Station in his book on "Feeds and Feeding" reports that skim milk contains 9.4 and buttermilk contains 9.9 pounds of dry matter to 100 pounds of milk, a difference of but five-tenths of a pound, so we may consider them practically equal in this respect. These products are usually much cheaper in the market than the by-products of the mills and factories, can usually be obtained cheaper, are a home product and serve the same purpose in narrowing the ration as the higher priced commercial feeding stuffs.

### THE EXPERIMENTS

The results of two experiments with pig feeding are contained herein. 1. To determine the comparative value of but-



termilk, sweet skim milk and sour skim milk when fed in conjunction with corn. 2. To determine the practical value of the "Hog Motor" a contrivance to compel the hog to grind his grain before eating it.

#### Experiment No. 1

This included a period of sixty-two days each in the summers of 1910 and 1911. The pigs were all good thrifty individuals of their kind, consisting of pure-bred Poland-Chinas, Duroc-Jerseys, Berkshires, Hampshires and grade Duroc-Jerseys. Each year the twenty-four head were divided into lots of six head each, as equal in breed and size as was possible, placed in small lots in which there was an abundance of blue grass pasture, and weighed up for the experiment. Each was given its feed regularly morning and evening and the quantity regulated until it was receiving all the grain it would eat.

In the 1910 experiment an average of about two and one-half pounds of milk was fed for every pound of shelled corn. In the 1911 experiment an average of about three pounds of milk was fed for every pound of shelled corn. Each year a lot was fed on shelled corn without milk as a check lot. At the close of the experiments the pigs in the check lots were not as fat as those in the other lots and did not have the finish of those in the milk lots. These pigs were weighed every thirty days. The following table includes the number of pig, the weight at the beginning, the weight at the close, the total gain and the average weights and gains for the period for both years.

TABLE No. I.  
Weights and Gains

1910 Experiment

1911 Experiment

## SHELLED CORN

Number of pig	Weight at beginning	Weight at close	Gain	Number of pig	Weight at beginning	Weight at close	Gain
1	82	147	65	16	117	198	81
2	86	145	59	1	87	152	65
11	118	198	80	..	119	162	43
3	76	150	74	4	87	146	59
4	66	127	61	5	85	147	62
5	91	158	67	3	95	154	59
Totals	519	925	406	..	590	959	369
Averages	86	154	68	..	98	159	61

## Shelled Corn and Sweet Skim Milk

31	99	220	121	11	103	203	100
32	104	180	76	7	76	178	102
33	84	201	117	9	77	186	109
34	56	147	91	10	112	193	81
35	106	218	112	8	97	191	94
29	97	196	99	12	95	220	125
Totals	546	1162	616	..	560	1171	611
Averages	91	193	102	..	93	194	101

## Shelled Corn and Sour Skim Milk

13	101	221	120	13	88	192	104
14	88	182	94	17	89	198	109
15	82	171	89	18	86	200	114
16	105	201	96	14	123	199	76
17	95	181	86	15	74	180	106
18	118	225	107	30	77	197	120
Totals	589	1181	592	..	537	1166	629
Averages	98	196	98	..	89	194	106

## Shelled Corn and Buttermilk

19	115	235	120	22	90	178	88
20	67	160	93	19	117	196	79
21	95	200	105	21	84	190	106
22	85	169	84	23	87	204	117
23	100	215	115	20	91	214	123
26	90	178	87	29	94	209	115
Totals	552	1157	605	..	563	1191	628
Averages	92	193	101	..	93	198	105

From a study of the above table it is evident that when milk was fed with the corn and grass, the pigs weighing between 80 and 100 pounds more than doubled their original weights in two months' feeding, but where no milk was fed the original weight was not gained in a single instance during this time. Neither can it be said that the heaviest or the lightest pig in a lot will do the better. Of the 48 head only one



pig made an average gain of two pounds per day. This was No. 12 in the sweet skim milk lot of the 1911 experiment. This pig had an extra large middle and evidently utilized larger quantities of feed. The writer has often thought there was much room for further improvement in the various breeds of swine by selecting types for special purposes. Some sows are heavy milkers while others are light milkers. The heavy milking sows always raise a good litter of pigs, while with the poor milkers an inferior litter is the result. The start the pig receives during the first six weeks from the good milking sow is noticeable ever afterwards.

Some pigs are heavier feeders than others, as was the case with this heavy gainer and a few others in the lots, a highly desirable character in any breed. Further, it will be seen by table No. 1 that there was a difference in the gain each year for the three lots that received milk with their corn, of only four pounds. The lots that received milk made an average gain, in 62 days, of 32 and 42 pounds more, respectively, than did the lots that did not receive milk.

Table No. II includes the total number of pounds of feed fed, total gain, feed for pound of gain and the average gain per head daily for both experiments.

**TABLE NO. II.**  
Totals and Averages

Kind of Feed	Grain consumed	Gain	Milk consumed	Grain for pound of gain	Milk for pound of gain	Average gain per head daily
Shelled corn .....	3632	775	.....	4.68	.....	1.04
Shelled corn and sweet milk .....	3831	1227	10547	3.12	8.59	1.65
Shelled corn and sour milk .....	3889	1221	10656	3.18	8.72	1.64
Shelled corn and buttermilk .....	3889	1233	10656	3.15	8.64	1.66

By feeding milk a larger quantity of grain was consumed by each lot. The largest gain for feed consumed was with the lots that received sweet milk and shelled corn. But the quantity of feed required for a pound of gain with the lots that received milk is so nearly the same, that these feeds appear to be about equal for pig feeding. The average gains per



head daily for pigs in these three milk lots are practically the same. Anything added to the ration of a fattening animal that will increase the appetite to cause a larger consumption of feed, must be considered a benefit, providing the cost of such product is not prohibitive.

Each bushel of corn fed without milk yielded an average of 11.9 pounds of pork. Each bushel of shelled corn fed with 154 pounds of sweet skim milk yielded an average of 17.9 pounds of pork. Each bushel of shelled corn fed with 153 pounds of sour skim milk yielded an average of 17.6 pounds of pork. Each bushel of shelled corn fed with 153 pounds of buttermilk yielded an average of 17.7 pounds of pork. The record shows that an average of 153 pounds of milk and one bushel of corn yielded an average of 17.7 pounds of pork. These figures show that the 153 pounds of milk increased the average gain of 5.8 pounds of pork for every bushel of corn fed, so that this milk was equal to the amount of corn required to produce this gain in shelled corn lots which in this case is about one-half a bushel.

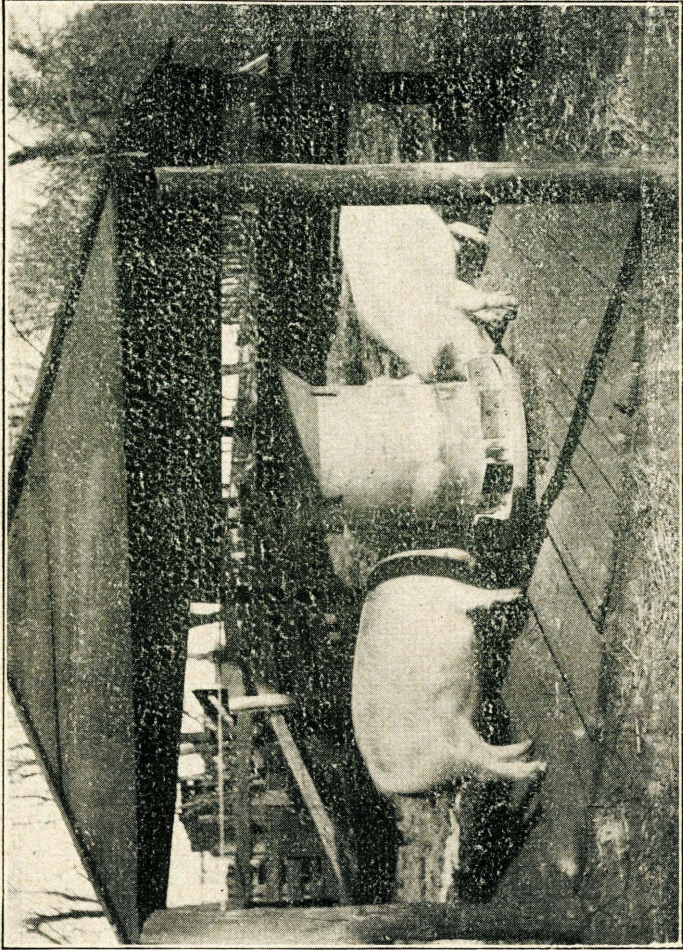
The price of corn and pork varies in the market, hence we did not consider it an advantage to report these results on a financial basis. The grass pasture was a factor in these gains, as the pigs grazed during the evening and the cooler days.

## EXPERIMENT No. II.

This experiment was conducted to determine the practical value of the "Hog Motor" for fattening hogs.

The "Hog Motor" is a machine so constructed with a pair of burrs that the hog is compelled to grind all the grain before he receives it. Many advantages are claimed for this mill, and the exhibits at many of our state fairs during the past few seasons where the hog was working for his feed attracted considerable attention.

Fattening animals require more or less exercise, and especially swine. In the early spring when the sow and the pigs are enclosed in a small place much trouble is reported from the fattest pigs of the litter dying. This can be avoided if the sow is separated from her pigs and cause them to worry once or



"Hog Motor"



twice each day until they can be turned in a yard when she will provide the exercise.

The value of ground grain and whole grain for fattening swine has received attention at many of the experiment stations throughout the United States, and more especially at those located in the corn belt.

Rommel, of the United States Department of Agriculture, after making an extensive study of the subject, reports in Bulletin No. 47, Bureau of Animal Industry as follows: "The results detailed show a preponderating amount of evidence in favor of corn meal, judging purely from the basis of feed required for 100 pounds of gain and disregarding the expense of grinding. The average of 19 trials with 297 pigs where the amount of feed eaten is reported, is 524 pounds of grain required per 100 pounds of gain when corn is fed whole in the form of shelled corn, and 479 pounds when fed ground, a difference of nearly 8.59 per cent in favor of grinding. This is considerably higher than the value usually given for corn meal, and may be explained to some extent by the large amount of feed required to make a given amount of gain in some of the experiments, notably the first at the Ohio Station, which must have been due to extraordinary conditions. Careful researches show that an exact estimate cannot yet be made of the comparative value of shelled corn and corn meal. It is worthy of particular attention, however, that in these experiments there were only 9 instances out of twenty-six where the value of the two feeds was equal, or in favor of whole grain; and in one of the latter, the first Missouri test, although the gains are considerably in favor of the pigs on corn meal, they were more economically made by the pigs on whole corn. The instances that favor whole grain are the Maine experiments, the first in Ohio, the second in West Virginia, the first in Kentucky, the first in Missouri, and the fifth, eighth and eleventh in Wisconsin." Rommel states further "The only definite conclusion that can be drawn from these figures is that it is beyond anyone to say that an advantage may be expected to follow the feeding of corn meal sufficient to pay the cost of grinding. If corn sells on the open market at 50 cents per bushel of 56 pounds and grinding costs from 3 to 5 cents per



bushel, a saving of ten per cent by such method would be very good economy ; but if corn falls to 25 cents the cost of grinding must be lessened to make meal feeding profitable."

In the fall of 1911 eight head of pigs averaging a trifle over two hundred pounds were divided into two lots of four head each for the experiment. These pigs were placed in yards and had access to a good rape pasture. In one lot was placed the "Hog Motor" filled with shelled corn and in the other lot was placed the self-feeder filled with corn meal. In a few days when the pigs in the motor lot became acquainted with the machine and were working it successfully the two lots were weighed up for the experiment and the grain weighed from then until the close of the experiment which covered a period of 61 days. The corn for the self-feeder lot was ground to the same consistency as that ground by the motor lot. These pigs were older and fatter at the beginning than those reported in Experiment I in this bulletin and this is the reason why it required more pounds of grain for a pound of gain. However, referring to the gains on the first period (See Table No. I) they were as good as could be expected, on hogs of this weight, when corn was fed alone, and are undoubtedly larger than they would have been with shelled corn.

TABLE No. I.

## Weights and Gains Hog-Motor Lot

No. of pig	First weight	Second weight	Gain 31 days	Final weight	Gain second 30 days	Total gain per head	Average gain per head daily
32	219	280	61	303	23	84	1.38
31	230	292	62	320	28	90	1.47
33	219	276	57	326	50	107	1.75
H.	175	228	53	257	29	82	1.34
Totals	843	1076	233	1206	120	363	....
Averages	210	269	58	301	30	91	1.49

## Self-Feeder Lot

36	260	333	73	370	37	110	1.80
34	219	277	58	306	29	87	1.42
37	225	280	55	303	23	78	1.28
35	233	309	76	339	30	106	1.74
Totals	937	1199	262	1318	119	381	....
Averages	234	299	65	329	30	95	1.56

The unusually cold weather in November when the thermometer registered at zero and below, is responsible for the small gains for each lot during the second thirty days of the experiment. During this time the lot doing their own grinding gained as much as the lot receiving the grain ground before feeding. As before stated in this bulletin, hogs do not gain as rapidly during cold weather as when it is warmer, probably because a larger per cent of grain is required to maintain body heat during cold weather.

There are certain grains that should always be ground, because when fed whole a large per cent will be found unground in the excrement. Sometimes grains will become dry, hard and flinty; and will be increased in palatability if ground.

The following table reports the total pounds of grain consumed, total gain and grain for pound of gain:

**TABLE No. II.**  
**Total Grain and Gains**

	Pounds grain consumed	Gain	Grain for pound of gain
Hog-Motor Lot.....	2047	363	5.63
Self-Feeder Lot.....	2180	381	5.72

Table No. II shows that the hogs eating meal from the self-feeder consumed 133 pounds more during the 61 days and made 18 pounds more gain than did the lot doing their own grinding, but it required .09 more pounds of grain for a pound of gain with this lot than with the motor lot. The additional 18 pounds of gain made by the self-feeder lot was made with 133 pounds of grain and the cost of grinding the corn, while with the motor double the number of hogs could have worked the grinder. Each bushel of corn meal fed in the self-feeder yielded an average of 9.79 pounds of pork and each bushel of shelled corn fed in "Hog Motor" yielded an average of 9.94 pounds of pork, a difference of .15 pounds of pork in favor of the lot that did their own grinding with the "Hog Motor." Every particle of grain that comes through the mill is eaten with



no waste and the mill is durably built and ought to last for several years. From these results we consider the "Hog Motor" a useful device in swine feeding.

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### SUMMARY

1. Sweet skim milk, sour skim milk and buttermilk are practically equal for pigs when fed in the proportion of from two and one-half to three pounds of milk to one pound of shelled corn.

2. Pigs weighing from 80 to 100 pounds, on a ration of corn and milk in proportion as above stated, made an average gain of 1.65 pounds daily during a feeding period of 62 days.

3. The lots receiving milk made an average gain, in 62 days of 32 and 42 pounds more, respectively, than did the lots receiving shelled corn and water.

4. The milk evidently increased the appetite, since the pigs receiving it consumed a larger quantity of grain.

5. In fattening an animal, any feed that will increase the consumption of grain and hasten early maturity, providing the cost of such product is not prohibitive, must be considered a benefit.

6. Ordinarily, with all ages of swine, a bushel of shelled corn will produce an average of 10 pounds of pork. In this experiment, on an average for the two years of feeding period of 62 days each, a bushel of shelled corn yielded 11.9 pounds of pork. But when an average of 153 pounds of milk was fed with a bushel of shelled corn, an average yield of 17.7 pounds of pork was produced. This was a difference of 5.8 pounds in favor of the milk lots; or in other words, the milk was equal to 5.8 pounds of pork. However, it must not be understood that this quantity of milk fed to a pig without the corn would yield this amount of gain; but when fed in combination, as above stated, similar results are to be expected.

7. The pig is the most economical producer of all meat-producing animals on the farm, yielding larger returns daily for live weight and feed consumed than either the sheep or the steer and furnishing a market at home for grain and dairy by-products.



8. Where the pigs in both lots had access to all the feed they would eat, the gains during the unexpected cold weather was a factor in lessening the total gains for each lot. In the lot in Experiment No. 1 where the pigs made a larger average daily gain, they were about two months younger but of a desirable market weight at the close of the experiments. From this we might suggest that greater profit would be made if hogs are fattened earlier and disposed of before danger of cold weather.

9. Pigs receiving corn meal from a self-feeder, made larger gains than those doing their own grinding with the "Hog-Motor," but the number of pounds of grain required for a pound of gain was larger with the self-feeder than with the lot doing their own grinding.

10. The cost of grinding is a factor that must be considered in feeding corn meal and from the results of this test we believe the "Hog-Motor" practical and a grain-saver.

## AVAILABLE BULLETINS:

89. Preliminary Experiments with Vapor Treatments for the Prevention of Stinking Smut in Wheat.
90. Tankage and other By-Products for pigs; Shrunken Wheat for Swine.
91. Co-Operative Vegetable Tests in 1904; Peas, Beans, Sweet Corn, Cabbage.
94. Alfalfa and Red Clover.
95. The Treatment of Nail Pricks of the Horse's Foot.
96. Forage Plants and Cereals at Highmore Sub-Station.
97. Speltz and Millet for the Production of Baby-Beef.
98. Crop Rotation.
99. Macaroni and Durum Wheats. A continuation of Bulletin 92.
100. The Value of Speltz for the Production of Beef and Pork.
101. Forage Plants at the Highmore Sub-Station, 1906.
103. Breeding Hardy Strawberries.
104. Breeding Hardy Raspberries.
105. Stock Food for Pigs.
106. Sugar Beets in South Dakota.
107. Sheep Scab.
108. New Hybrid Fruits.
109. Rusts of Cereals and other Plants.
110. Progress in Variety Tests of Oats.
111. A Study of South Dakota Butter with Suggestions for Improvement.
112. The Killing of Mustard and other Noxious Weeds in Grain Fields by the use of Iron Sulphate.
113. Progress in Variety Tests of Barley.
114. Digestion Coefficients of Grains and Fodders for South Dakota.
115. Report of Work for 1907 and 1908 at Highmore Sub-Station.
116. Acidity of Creamery Butter and its Relation to Quality.
117. Sugar Beets in South Dakota.
118. Corn.
119. Fattening Lambs.
120. Progress in Variety Tests of Alfalfa.
121. Sugar Beets in South Dakota.
122. Creamery Butter.
123. Milk Powder Starters in Creameries.
124. Progress in Grain Investigations.
125. Fattening Steers of Different Ages.
126. Alkali Soils.
127. Breeding and Feeding Sheep.
128. Progress in Wheat Investigations.
129. Growing Pedigreed Sugar Beet Seed in South Dakota.
130. Some New Fruits.
131. Scabies (Mange) in Cattle.
132. Effects of Alkali Water on Dairy Products.
133. Alfalfa as a Field Crop in South Dakota.
134. More Winter Dairying in South Dakota.
135. Trials with Millets and Sorghums for Grain and Hay in South Dakota.