

# Self-Feeders for Fattening Swine

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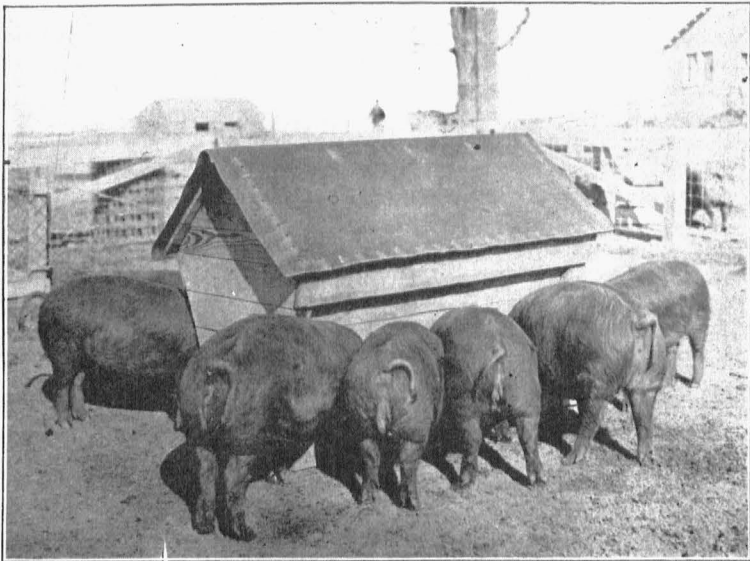


Fig. 1.—Fattening hogs fed with a self-feeder make rapid and economical gains

Agricultural experiment stations and practical feeders have demonstrated that the costs in swine feeding may be lowered, first by supplementing the corn ration with some feed like tankage, linseed oil meal, or skimmilk; and second by the greater use of forage crops. An effort to decrease still further the production cost has led to a demand for information on better preparation of feeding stuffs and improved methods of feeding

The Missouri Agricultural Experiment Station has conducted a number of experiments to obtain definite information with which to answer the large number of inquiries received from Missouri farmers concerning the value and limitation of self-feeders. In these experiments, the rate and economy of gain made by hogs using a self-feeder was compared with the rate and economy of gain made by similar hogs which were hand-fed in the usual manner.

All lots were supplied with an abundance of drinking water. The hogs also had access to a mixture of copperas 3 parts, glauber's salts 3 parts, common salt 3 parts,

sal soda 3 parts, and sulphur 1 part by weight, which served as a conditioner, kept them free from worms and supplied ash or mineral matter.

In the first four of these experiments all the hogs were fed in dry lots and were provided with ample shelter. In the fifth experiment the hogs were pastured on rape forage during the entire experiment.

The hogs were weighed individually three consecutive days at the beginning and close of the experiment. The average of these weights was used as the initial and final weights, respectively. Weekly individual weights were taken throughout the experiment.

### EXPERIMENT I

**General Plan.**—For the first experiment the general plan was to divide fourteen shotes into two lots of seven each. All hogs were fed the same ration and handled in exactly the same way except in the manner of supplying the feed.

**Animals Used.**—The shotes were purebred Duroc Jerseys, sired by the same boar and out of dams of similar breeding. Their previous treatment had been uniform and they were in good condition, since they had been fed liberally from birth. Their average weight at the beginning of the trial was 112 pounds a head.

**Rations and Methods of Feeding.**—Each lot was fed a ration of shelled corn 12 parts, tankage 1 part by weight—former experimental results having shown that the addition of tankage to a corn ration is desirable for fattening hogs weighing 100 to 125 pounds.

Lot 1 received their feed, after it had been mixed in proportions indicated previously, from a home-made, hopper-type self-feeder. In other words they had access to the feed at all times so they could eat as much as or little as they desired at any time. Lot 2 was hand-fed regularly twice a day in the usual manner by placing the dry feed in a trough morning and evening. They were given all the feed they would readily consume at each feeding.

**Time of Experiment.**—The experiment began April 4, 1914 and ran 56 days to May 30, 1914.

**Results.**—The experiment proceeded in an apparently normal manner throughout the entire period of feeding. None of the hogs was off feed nor did anything abnormal happen at any time during the test to affect the results.

Table 1 (on page 4) gives the results obtained in all five of the experiments.

The results of the first trial with a self-feeder for fattening swine show very little difference which can be attributed to the different method of supplying the feed. The hogs on the self-feeder made an average gain of 1.97 pounds while the hand-fed lot averaged 1.98 pounds. The self-fed hogs ate 7.85 pounds of feed a day while those which were hand-fed ate 8.28 pounds. The amount of feed required to produce 1 pound of gain in the case of the self-fed hogs was 4.00 pounds as compared with 4.18 pounds for the lot which were hand fed. With corn at 75 cents a bushel and tankage at \$2.50 a hundred the cost per hundred pounds gain would be \$6.40 in the case of the hogs fed with the self-feeder and \$6.68 for the hand-fed lot.

### EXPERIMENT II

**General Plan.**—The general plan of the second trial with self-feeders for fattening swine was similar to the first except that 10 hogs were fed in each lot.

**Animals Used.**—As in the former trial the shotes were purebred Duroc Jerseys of similar breeding which had had the same previous treatment. The average weight at the beginning of the experiment was 77.4 pounds a head.

**Rations and Method of Feeding.**—Each lot was fed shelled corn, shorts and tankage. The feed for Lot 3 was supplied in self-feeders, similar to the one used in

Experiment I. In this trial, however, each feed was placed in a separate compartment and the hogs were allowed to eat as much of each feed as they desired. In other words, the shelled corn was in one place, the shorts in another and the tankage in another so that the hogs could make their ration consist entirely of any one feed, any two, or a combination of all three. Lot 4 was hand-fed the same feeds received by Lot 3. The ration consisted of 8 parts shelled corn, 2 parts shorts and 1 part tankage by weight. The ration was given dry twice daily in a trough.

**Time of Experiment.**—Experiment II began August 14, 1915 and continued 60 days to October 12, 1915.

**Results.**—Table 1 also gives the results obtained from the second trial to compare the rate and economy of gain made by fattening hogs fed with a self-feeder and those hand-fed in the usual manner.

The results reported in this table show that the hogs which were self-fed made more rapid gains than those which were hand-fed. The average daily gain in the case of the hogs fed with the self feeder was 1.69 pounds as compared with 1.51 pounds for the hand-fed lot. The final weight of the hogs on the self-feeder was 178.9 pounds, while the hand-fed lot weighed 168.0 pounds at the close of the trial.

While the self-fed hogs gained more rapidly, they also consumed more feed, 7.08 pounds a head daily. The hogs which were hand-fed, ate 6.07 pounds or approximately 1 pound a day less than the hogs on the self-feeder.

There was little difference in the economy of gain. It required 4.19 pounds of feed to produce a pound of gain on the self-fed hogs and 4.04 pounds to produce 1 pound of gain on the hand-fed hogs. With corn at 75 cents a bushel, shorts at \$1.40 a hundred and tankage at \$2.50 a hundred, the cost of 100 pounds gain for Lot 3 (self-fed) was \$5.75 and for Lot 4 (hand-fed) \$5.66.

### EXPERIMENT III

**General Plan.**—There was no material difference in the general plan of this experiment and those already discussed, except that three different lots were fed.

**Animals Used.**—The hogs fed in this trial were somewhat heavier than those used in either of the previous tests. The average weight of the hogs in the different lots varied from 136.4 pounds to 150.2 pounds. They were grade hogs (principally a mixture of Duroc Jersey and Poland China) which had been purchased the previous spring and run through the summer on a forage crop experiment. During the time they were on forage they were fed grain in addition so that they gained approximately  $\frac{3}{4}$  pound per 100 pounds live weight daily which means that they received from one-half to two-thirds of a full feed of grain. They were, then, well-grown shotes but not fat.

**Rations and Methods of Feeding.**—Lot 5 received a ration of shelled corn, shorts and tankage. Each feed was placed in a separate self-feeder so that the hogs could eat as much or as little of each feed as they wished.

Lot 6 received a ration of shelled corn in one self-feeder and tankage in another.

Lot 7 received a ration of shelled corn 12 parts, tankage 1 part by weight. These feeds were mixed and fed dry twice daily in a trough. The hogs were given all they would clean up readily at each feeding.

**Time of Experiment.**—This test began September 4, 1915 and closed October 12, 1915, 42 days later.

**Results.**—The third section of Table 1 gives the results obtained.

It will be seen from the table that there was practically no difference in the rate of gain made by the two lots of hogs fed corn and tankage. The self-fed lot made an average daily gain of 1.77 pounds a head while the hand-fed lot gained 1.76 pounds. It should be noted, however, that the self-fed hogs ate a larger proportion of tankage.

TABLE 1—RESULTS WITH THIRTEEN LOTS IN FIVE EXPERIMENTS COMPARING SELF-FEEDING WITH HAND-FEEDING

Experiment and lot	No. of Hogs	Days on feed	Weight of Hogs		Proportion of Feeds Eaten			Amount of Feeds Eaten			Gain Made	
			Initial	Final	Corn	Shorts	Tankage	Total	Av. daily per head	per lb. gain	Total	Av. daily per head
<b>Experiment I.</b>												
Lot 1.—Self-fed	7	56	112	222	12	0	1	3,080	7.85	4.00	770	1.97
Lot 2.—Hand-fed	7	56	112	223	12	0	1	3,250	8.28	4.18	777	1.98
<b>Experiment II.</b>												
Lot 3.—Self-fed	10	60	77.4	178.9	17.5	5.6	1	4,250	7.08	4.19	1,015	1.69
Lot 4.—Hand-fed	10	60	77.4	168.0	8	2	1	3,663	6.07	4.04	906	1.51
<b>Experiment III.</b>												
Lot 5.—Self-fed	10	42	137.7	238.5	18.5	8.1	1	3,654	7.25	3.63	1,008	2.00
Lot 6.—Self-fed	10	42	136.4	225.5	8.9	0	1	3,124	6.20	3.50	891	1.77
Lot 7.—Hand-fed	12	42	150.2	224.4	12	0	1	3,632†	7.20	4.07	890.4†	1.76
<b>Experiment IV.</b>												
Lot 8.—Self-fed	10	60	122.2	219.2	17.1	0	1	4,470	7.45	4.61	970	1.62
Lot 9.—Hand-fed	10	60	119.8	212.4	12	0	1	4,281	7.14	4.62	926	1.54
Lot 10.—Self-fed	10	60	121.0	228.9	20.66	3.93	1	4,911	8.19	4.55	1,079	1.80
Lot 11.—Hand-fed	10	60	122.7	223.3	8	2	1	4,409	7.35	4.38	1,006	1.68
<b>Experiment V.*</b>												
Lot 12.—Self-fed	8	112	39.98	157.92	11.6	0.23	1	3,611	4.03	3.84	943.52	1.05
Lot 13.—Hand-fed	8	112	39.91	146.79	9	3	1	3,114	3.47	3.65	855.04	0.95

\*Hogs in Experiment V were pastured on rape forage during the entire experiment.

†There were 12 hogs in this lot as compared to 10 each in Lots 5 and 6.

The lot which was self-fed on corn, shorts and tankage made more rapid gains than either of the lots just mentioned, namely 2 pounds a head daily so that at the end of the trial the hogs receiving shorts in addition to the corn and tankage, weighed 238.5 pounds as compared with 225.5 pounds for the corn and tankage self-fed lot and 224.4 pounds for the lot which was hand-fed corn and tankage.

The lot receiving corn, shorts and tankage in a self-feeder ate an average of 7.25 pounds of feed a head daily which was practically the amount eaten by the hand-fed corn and tankage lot. The hogs self-fed on corn and tankage ate about 1 pound less per head daily than either of the other lots as will be seen from Table 1.

Lot 5 (self-fed corn, shorts and tankage) required 363 pounds of feed to produce 100 pounds gain.

Lot 6 (self-fed corn and tankage) required 350 pounds of feed to produce 100 pounds of gain.

Lot 7 required 407 pounds of feed for each 100 pounds of gain made.

With corn at 75 cents a bushel, shorts \$1.40 a hundred and tankage \$2.50 a hundred, the cost per hundred pounds gain was \$5.07 for Lot 5, \$5.05 for Lot 6 and \$5.78 for Lot 7.

While the foregoing costs do not show any advantage for the addition of shorts to the ration, it should be remembered that the hogs made more rapid gains when they received shorts in addition to the corn and tankage and hence reached a marketable weight in less time.

#### EXPERIMENT IV

**General Plan.**—The general plan of Experiment IV was to compare the rate and economy of gain made by four lots of 10 hogs each, which were fed as follows:

Lot 8 corn and tankage (self-fed)

Lot 9 corn and tankage (hand-fed)

Lot 10 corn, shorts and tankage (self-fed)

Lot 11 corn, shorts and tankage (hand-fed)

**Animals Used.**—The hogs used in this experiment were in general the same kind as those fed in Experiment III, namely grade shotes which had been purchased the previous spring and pastured during the summer on forage. The manner of feeding during the time they were on the forage was such that they received enough grain to gain approximately  $\frac{3}{4}$  pound per 100 pounds live weight a day. At the beginning of this experiment they were well grown but not fat.

**Rations and Methods of Feeding.**—Lot 8 received a ration of shelled corn in one self-feeder and tankage in another.

Lot 9 received the same ration as Lot 8 but in the proportion of shelled corn 12 parts, tankage 1 part by weight and the ration was fed dry in a trough twice daily.

Lot 10 received a ration of shelled corn, shorts and tankage. Each feed was supplied in a separate self-feeder.

Lot 11 received the same ration as Lot 10 except that it was hand-fed dry twice daily in a trough and in the proportion of 8 parts corn, 2 parts shorts and 1 part tankage, by weight.

All hand-fed lots were fed all the feed they would readily clean up at each feeding.

**Time of Experiment.**—Experiment IV began October 30, 1915, and ran 60 days to December 28, 1915.

**Results.**—From the table it is seen that the hogs in Experiment IV which were self-fed on corn and tankage made slightly more rapid gains than those which were hand-fed the same ration, 1.62 pounds per head daily as compared with 1.54 pounds. The self-fed hogs also ate a little more grain. Their daily ration was on the average

7.45 pounds as compared with 7.14 pounds. It required practically the same amount of feed for each lot for one hundred pounds gain in live weight. With corn at 75 cents a bushel, shorts at \$1.40 a hundred and tankage at \$2.50 a hundred, the cost of one hundred pounds gain was \$6.43 for the self-fed hogs and \$6.56 for the hand-fed.

The foregoing results show, then, that there was very little difference in the two lots which could be attributed to the difference in method of supplying the feed.

From the table on page 4 it will be observed that the hogs which were self-fed gained on the average 1.8 pounds per head daily as compared with 1.68 pounds made by the hogs in the hand-fed lot. The self-fed hogs ate daily an average of 8.19 pounds a head as compared with 7.35 pounds, the amount consumed by the hand-fed hogs. The self-fed lot required 4.55 pounds of feed to produce 1 pound of gain and the hand-fed 4.38 pounds. In other words the self-fed hogs gained somewhat more rapidly but ate a little more grain so that there was not much difference in the amount of feed required to produce a given amount of gain. With corn at 75 cents a bushel, shorts \$1.40 a hundred and tankage at \$2.50 a hundred, the cost per 100 pounds gain was practically the same—\$6.31 for Lot 10 and \$6.35 for Lot 11.

From the same table it will be seen that Lots 10 and 11 getting shorts in addition to tankage each gained more rapidly than Lots 8 and 9. There was little difference in the amount of feed consumed so that in terms of feed required to produce 100 pounds gain, the lots getting shorts in addition to the corn and tankage made their gain with slightly more economy.

#### EXPERIMENT V

**General Plan.**—In general plan, this experiment differed from those preceding mainly in that the two lots of eight hogs each were on rape forage instead of in a dry lot. They were handled in exactly the same way except in the manner in which the grain ration was fed.

**Animals Used.**—The pigs used in this trial were farrowed the spring of 1916 and were placed on experiment soon after weaning. Each lot contained six purebred Poland China gilts of similar age and breeding. There was also one purebred Berkshire and one purebred Duroc Jersey in each lot. The average weight of the pigs, at the beginning of the experiment, was approximately 40 pounds.

**Quarters.**—Each lot of eight pigs was placed in a half acre plot which had previously been seeded to Dwarf Essex rape broadcast at the rate of 6 pounds of seed per acre. When the pigs were turned into the plots the rape had made a luxuriant growth and was 18 to 24 inches high. No effort was made to determine the amount of pork each plot would produce. The object was to furnish abundant forage during the entire experiment, hence the rape was never pastured so heavily but that there was always plenty of forage available. Shade was provided for each lot and each lot contained an ordinary barrel waterer, which supplied drinking water at all times.

**Rations and Methods of Feeding.**—Each lot received ground corn, shorts and tankage.

Lot 12 was self-fed. Each feed was placed in a separate compartment so that the hogs could choose the kind and amount of feeds that they wished.

Lot 13 received their feeds in the proportion of corn 9 parts, shorts 3 parts and tankage 1 part by weight, mixed with water and fed twice daily as a thick slop.

**Time of the Experiment.**—The experiment began June 19, 1916 and ran 112 days to October 9, 1916.

**Results.**—The results obtained during this period are reported in the table on page 4. From this table it will be seen that the self-fed hogs (Lot 12) made slightly more rapid gains than those which were hand-fed (Lot 13). The average daily gain per

head for the pigs in Lot 12 was 1.05 pounds as compared with 0.95 pounds for the pigs in Lot 13. Lot 12, however, ate more feed, 4.03 pounds per head daily, than Lot 13, which ate 3.47 pounds daily per head.

Lot 12 (self-fed) ate 3.84 pounds of feed for each pound of gain. Lot 13 (hand-fed) ate 3.65 pounds of feed for each pound of increase in live weight.

In connection with the foregoing discussion and the results noted in the table it should be said that there was an apparent difference in the condition of the two lots. The pigs which were self-fed were without question the fattest while those which were hand-fed had apparently made a little more growth. In other words the difference in weight does not tell the whole story, for it appeared that the gain made by the self-fed lot was due to fat deposition to a greater extent than the gain made by the hand-fed lot.

### SUMMARY

**Experiment I.**—In this experiment there was no appreciable difference in either the rate or economy of gain due to the method of feeding.

The hogs which were self-fed a ration of shelled corn 12 parts, tankage 1 part (by weight) averaged 1.97 pounds gain per head daily while the hogs hand-fed the same ration averaged 1.98 pounds gain per head daily.

It required 400 pounds of feed to produce 100 pounds of pork when the hogs were self-fed and 418 pounds when the hogs were hand-fed in the usual manner.

**Experiment II.**—In this experiment the self-fed hogs gained more rapidly than the hand-fed hogs. They ate more feed so that there was little difference in the economy of gain.

The self-fed hogs ate an average of 7.08 pounds of feed per head daily and gained an average of 1.69 pounds. The feed was consumed in the following proportions: corn 17.5 pounds, shorts 5.6 pounds, and tankage 1 pound.

The hand-fed lot ate 6.07 pounds per head daily or approximately 1 pound less than the self-fed lot. On this amount of feed each pig gained 1.51 pounds daily.

**Experiment III.**—The results of this trial showed no difference in the rate of gain of the hogs self-fed corn and tankage and those hand-fed the same ration. The self-fed lot gained 1.77 pounds per head daily as compared with 1.76 pounds for the hand-fed lot.

The hand-fed lot ate more feed and hence, did not gain so economically. It required 350 pounds of feed to produce 100 pounds gain when the feed was self-fed and 407 pounds when it was hand-fed. The self-fed hogs ate their feed in the proportion of 8.9 pounds of corn to each pound of tankage. This was a larger proportion of tankage than was given the hand-fed lot as their ration was corn 12 parts, tankage 1 part.

The lot which was self-fed in this trial and which received shorts in addition to the corn and tankage made the most rapid gain, namely, two pounds per head daily. They ate more feed than the lot self-fed corn and tankage and about the same as those hand-fed corn and tankage. It required 363 pounds of feed in the proportion of 18.5 pounds corn, 8.1 pounds shorts and 1 pound of tankage to produce 100 pounds gain.

**Experiment IV.**—The results in this trial with corn and tankage, self-fed, as compared with the same feeds, hand-fed were similar to those obtained previously. The self-fed lot ate slightly more feed and gained somewhat more rapidly. There was no difference in the amount of feed required to produce a given amount of gain. The self-fed lot ate an average of 7.45 pounds of feed daily and gained 1.62 pounds. The hand-fed lot ate 7.14 pounds and gained 1.54 pounds. In this case the self-fed

hogs ate a smaller proportion of tankage than those hand-fed—1 pound of tankage to each 17.1 pounds of corn.

The lot self-fed corn, shorts, and tankage gained more rapidly than the lot which was hand-fed the same feed—1.80 pounds per head daily as compared with 1.68<sup>c</sup> pounds. They also ate more feed—8.19 pounds per head daily as compared with 7.35 pounds.

There was little difference in the amount of feed necessary for a given amount of gain, but the self-fed hogs ate a larger proportion of corn. Their ration was made up of 20.66 parts of corn, 3.93 parts shorts and 1 part tankage; while the hand-fed lot received corn 8 parts, shorts 2 parts, and tankage 1 part.

As in previous trials the addition of shorts to the ration increased the rate of gain.

**Experiment V.**—With light-weight pigs on rape forage the self-feeder gave slightly more rapid gains.

The average daily gain for the self-fed hogs was 1.05 pounds as compared with 0.95 pounds for the hand-fed lot.

The self-fed hogs ate 4.03 pounds of feed per head daily while the hand-fed lot ate 3.47 pounds.

It required 384 pounds of feed to produce 100 pounds gain in the case of the hogs on rape and receiving grain from a self-feeder as compared with 365 pounds when the grain was hand-fed.

### CONCLUSIONS

The results obtained and set forth in the preceding pages do not, in the opinion of the author, warrant definite conclusions regarding the use and limitations of self-feeders for swine. They indicate however, the results which may be expected:

Fattening hogs fed with a self-feeder gain more rapidly than when hand-fed in the usual manner.

There is no difference in the economy of gain which can be accredited to the method of feeding. This statement applies only to the amount of feed necessary to produce a given amount of pork. If the self-feeder decreases the amount of labor involved, then it would be a factor in cheapening the cost of production.

When each feed is placed in a separate feeder the hogs will choose the different feeds, so that the gain will be both rapid and relatively economical. This will perhaps be true only when each feed is supplied in abundance. For example, if the feeds used were corn and tankage and the self-feeder containing corn was allowed to become empty the hogs would no doubt eat more tankage than it would be profitable to feed.

It is apparent that the advantage which the self-feeder method will have in any specific instance over hand-feeding, in regard to rate of gain, will depend to a large degree upon the ability of the person doing the hand-feeding to feed so that the hogs will consume a maximum amount of feed. In practically all cases, when the self-fed hogs gained more rapidly than those which were hand-fed, they also consumed more feed.

In a similar manner the relative efficiency of the self-fed ration, and the same feeds hand-fed, will depend upon the ability of the feeder to properly combine the feeds used.

While the work carried on gives little basis for comparison, it is the author's opinion that self-feeders are more practical for well-grown stock hogs, that is, shotes which have grown large frames but are thin, than for pigs weighing from 50 to 75 pounds.

Attention is called to the fact that this publication deals only with the use of self-feeders for fattening swine, that is, hogs which are on full feed of grain.