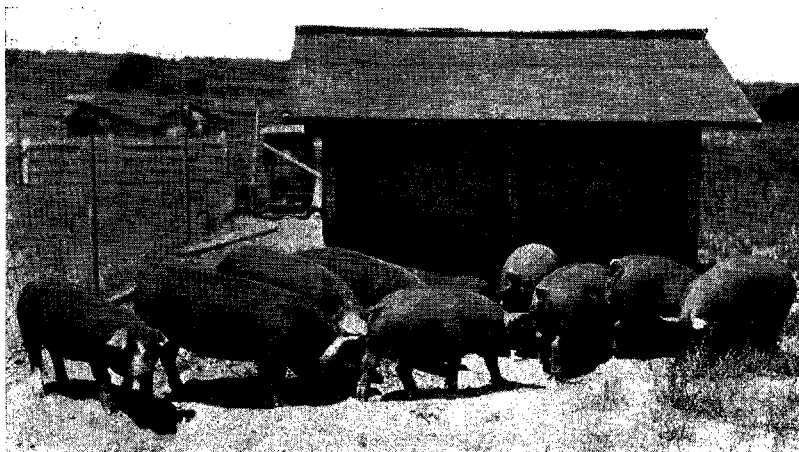


AGRICULTURAL EXPERIMENT STATION

KANSAS STATE AGRICULTURAL COLLEGE
MANHATTAN, KANSAS

DEPARTMENT OF ANIMAL HUSBANDRY



PIGS APPRECIATE SELF-FEEDERS

SWINE FEEDING INVESTIGATIONS, 1919-20

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PART I

BARLEY COMPARED WITH CORN FOR GROWING PIGS ON ALFALFA PASTURE

Aside from corn, barley is one of the most satisfactory feeds both for growing and fattening swine. The recent high price of corn has made the use of corn substitutes a very important question to hog producers. Changes in the relative prices of the different grains often make the substitution of one for another a good business proposition. With this in mind a comparison of corn and barley for growing pigs was made.

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FEEDING PLAN

The experiment was begun July 1, 1919, extended over a period of 120 days, and thus closed October 29, 1919. Forty pigs were started on the test—pigs, for the most part, farrowed after April 15. They were divided into four lots of 10 each and fed as follows: Lot 1, shelled corn and tankage; lot 2, dry ground barley and tankage; lot 3, soaked ground barley and tankage; and lot 4, soaked whole barley and tankage.

The grain and tankage were handfed night and morning. The soaked barley remained in water only from one feeding until the next to avoid souring. The grain in each lot was fed in the V-shaped troughs in which the pigs were watered. Block salt was kept before the pigs throughout the experiment.

Since alfalfa is the common pasture crop in much of that part of Kansas in which hogs are raised, the spring-farrowed pigs used in this experiment were fed upon alfalfa pasture. The season of 1919 was not a favorable one on account of the lack of moisture. Except for a rain three days after the test began there was no appreciable rainfall during the experiment. The pasture consequently furnished poor feed during the latter part of the 120 days. Fifteen pigs per acre is the basis used in alfalfa forage trials—a satisfactory number except in abnormally dry seasons.

Another factor detrimental to the rapid growth of the pigs was the light weight of the barley fed. The high percentage of hull was a decided disadvantage, especially for pigs as light in weight as those used.

RESULTS

The feed required to make 100 pounds gain and the relative efficiency of corn and barley fed in the different ways indicated are given in Table I. One pig was lost from lot 1, the corn and tankage lot. The results given in the table are reported on the basis of nine pigs in this lot.

SWINE FEEDING INVESTIGATIONS

TABLE I.—BARLEY VERSUS CORN FOR GROWING PIGS
ON ALFALFA PASTURE
(Feeding period, 120 days)

Lot No.	1	2	3	4
Number of pigs in lot.....	9	10	10	10
Average initial weight per pig.....	Pounds 37.51	Pounds 37.47	Pounds 36.85	Pounds 37.57
Feed required for 100 pounds gain:				
Shelled corn.....	306.78			
Dry ground barley.....		352.15		
Soaked ground barley.....			418.87	
Soaked whole barley.....				433.01
Tannage.....	28.78	26.17	31.69	32.74
Total.....	335.56	378.32	445.56	465.75
Relative efficiency of rations in percent on basis of least feed for 100 pounds gain.....	100.00	88.69	75.31	72.01

CONCLUSIONS

Several conclusions may be drawn from the results of this trial.

1. Barley did not prove as satisfactory when compared with corn as has been the case in experiments at other stations. The weight of the pigs fed in this and other tests was considerably different, as heavier pigs have been most often used in barley-feeding experiments. Grain barley carries a large amount of hull for pig-feeding purposes, especially for young light-weight pigs. This becomes a big factor when light chaffy barley is fed to young growing pigs.

2. Dry ground barley came the nearest to the results secured with corn of any form in which the grain was fed. Why did not soaking the grain give more satisfactory results? In no case was soured feed given so this cannot be the explanation. The reason probably is that the pigs fed dry ground barley were getting a feed already too bulky for them, and the water added to the grain, making it still more bulky, was a disadvantage rather than an advantage, particularly as alfalfa is a bulky rather than a concentrated feed and needs with it concentrates with little bulk. Grinding barley especially for young pigs seems to be decidedly a better method of preparation than soaking the grain.

3. The amount of feed necessary to make 100 pounds gain on the pigs was low except for the two lots receiving soaked barley. This shows that the feeds given, and not the pigs, were responsible for the poorer results secured with both soaked whole barley and soaked ground barley.

PART II

THE COMPARATIVE FEEDING VALUE OF CORN AND LOW-GRADE WHEAT

Since unfavorable weather conditions during the month of June, 1919, produced considerable shrunken wheat, a pig-feeding experiment was planned to get information as regards the comparative feeding value of corn and shrunken wheat and also to compare the efficiency of certain methods of feeding the wheat.

The price on the market for shrunken wheat at the time of the experiment represented a big discount from the price of plump well-matured wheat, while its feeding value, on account of the greater protein content, was higher. The shrunken wheat fed cost 3 cents per pound, the corn a little more than 2 $\frac{3}{4}$ cents per pound. Well-matured wheat will average 12 $\frac{1}{2}$ percent protein; the wheat fed in this experiment analyzed 16 percent protein.

FEEDING PLAN

Fifty pigs were secured for the experiment. They were divided into five lots of 10 each. Most of the pigs were farrowed in May and had been running on alfalfa pasture until the test was started, September 15, 1919. They were fed in dry lots, each having a concrete-floored space inside a large house and an outside dirt lot, 8 $\frac{1}{2}$ by 50 feet. The lots used were adjoining.

The rations and methods of feeding each lot were as follows: Lot 5, whole wheat and tankage fed separately in a self-feeder; lot 6, ground wheat and tankage—self-fed, free choice; lot 7, ground wheat—self-fed; lot 8, a mixture of equal parts of ground wheat and ground rye—self-fed; lot 9 (a check lot), ground corn and tankage fed separately in a self-feeder. All lots were given salt regularly with care so that no risk was run from poisoning.

RESULTS

The feed required to make 100 pounds gain and the comparative efficiency of the rations fed by the methods indicated are given in Table II.

SWINE FEEDING INVESTIGATIONS

TABLE II.—LOW-GRADE WHEAT VERSUS CORN FOR FEEDING PIGS
 (Feeding period, 120 days)

Lot No.	5	6	7	8	9
Number of pigs in lot	10	10	10	10	10
Average initial weight per pig	<i>Pounds</i> 60.40	<i>Pounds</i> 60.57	<i>Pounds</i> 60.00	<i>Pounds</i> 59.63	<i>Pounds</i> 59.13
Feed required for 100 pounds gain:					
Whole wheat	390.06	402.88	466.51	245.77	.....
Ground wheat .....	.....	.....	.....	245.77	.....
Ground rye .....	.....	.....	.....	.....	485.27
Ground corn .....	.....	.....	.....	.....	22.23
Tankage	17.85	19.30	.....	.....	507.50
Total	407.91	422.18	466.51	491.54	.....
Relative efficiency of rations in percent on basis of least feed for 100 pounds gain	100.00	96.62	87.44	82.98	80.38

Lot 5 was fed the most efficiently.

No advantage was gained by grinding badly shrunken wheat.

Wheat proved superior to corn whether fed with or without tankage. Even when equal parts of ground wheat and ground rye were fed without tankage the amount of feed necessary to make 100 pounds gain was less than with ground corn and tankage.

Many feeders attempt to economize by not buying protein supplemental feeds. In this experiment the use of tankage was an economy. By the use of 19.3 pounds of tankage there was saved 63.63 pounds of wheat. Wheat cost 3 cents and tankage 5.25 cents per pound. For each 100 pounds gain the addition of tankage to ground wheat saved 90 cents, a good profit in itself.

Rye as a grain to be fed with wheat gave good results. Since it would hardly be possible to self-feed the whole grains mixed, because the pigs would be apt to leave the rye, grinding is a necessary method of preparing the rye, and the wheat can easily be ground along with the rye.

CONCLUSION

Feeding shrunken wheat may often prove more satisfactory than marketing it as grain at a big discount. Certainly hogs can make bigger returns from wheat than from corn, and when prices of the two grains are nearly equal, as was the case in this experiment, economy in feeding will urge the substitution of wheat for corn.

PART III
RYE AS A SUBSTITUTE FOR CORN

While rye is one of the most easily produced of all grains, yielding well under varying soil and climatic conditions, its use as a feed is a difficult problem. In addition to being unpalatable, ground rye is rather sticky and pasty in the mouth, reports showing that it sometimes causes pigs to choke; yet as a substitute for high-priced corn its possibilities are worthy of study and this experiment was planned to get more information about the grain as a hog feed.

FEEDING PLAN

This experiment was conducted at the same time as the experiment with shrunken wheat described in Part II. In fact, lots 8 and 9 were used in both tests. Three other lots of 10 pigs each were added, pigs similar to those used in lots 1 to 9 and handled under similar conditions throughout. Lot 9 was used as the check lot for both tests. The rations and methods of feeding lots 10 to 12 were as follows: Lot 10, ground rye and tankage—self-fed, free choice; lot 11, a mixture of equal parts of ground corn and ground rye—self-fed, also tankage fed free choice; lot 12, a mixture of equal parts of wheat shorts and ground rye.

RESULTS

That rye was quite a satisfactory substitute for corn is shown by the results of the experiment given in Table III.

TABLE III.—RYE AS A CORN SUBSTITUTE FOR PIG FEEDING

Lot No.	8	9	10	11	12
Number of pigs in lot.	10	10	10	10	10
Average initial weight per pig.	<i>Pounds</i> 59.63	<i>Pounds</i> 59.13	<i>Pounds</i> 61.07	<i>Pounds</i> 58.43	<i>Pounds</i> 58.63
Feed required for 100 pounds gain:					
Ground rye.	245.77		486.58	243.80	279.88
Ground wheat.	245.77				
Ground corn.		485.27		243.80	
Wheat shorts.					273.26
Tankage.		22.28	23.60	30.48	
Total.	491.54	507.50	510.18	518.08	553.14
Relative efficiency of rations in percent on basis of least feed for 100 pounds gain.	100.00	96.85	96.34	94.87	88.86

Each of the lots except the one (lot 12) fed a combination of wheat shorts and ground rye compared very favorably with lot 9, fed corn and tankage.

One fact was noticeable about all the rye-fed lots. The pigs were more restless, their appetites were not so well satisfied, and the somewhat harsh appearance of their coats indicated that they were less thrifty than the corn and tankage or the wheat-fed groups.

Among the lots fed rye the best results were secured in lot 8 where equal parts of ground rye and ground wheat were mixed and self-fed.

CONCLUSION

In times of high-priced corn, rye, if available, can probably be used to a larger extent than has been the practice heretofore. As a general rule, the mixing of ground rye with some more palatable and better relished feed will result in more rapid gains and require a smaller amount of feed to make those gains than feeding rye with a protein supplement only.

PART IV

GRAIN SORGHUMS COMPARED WITH CORN

Over a large portion of the state grain sorghums are a much surer crop than corn. Home-grown feeds are usually cheaper than those which are shipped in; consequently the sorghum grains should be used for feed to a much greater extent than is the present practice. Western Kansas produces large quantities of these grains; the kafir, milo, and feterita fed in this experiment were purchased from the Fort Hays Branch Experiment Station, Hays, Kan. Grinding is necessary when these grains are fed, as the whole seeds are so small many are not masticated but pass through the animal without being digested.

FEEDING PLAN

Two groups of pigs were available for this experiment: (1) Spring-farrowed pigs about nine months of age and weighing about 160 pounds each; and (2) fall-farrowed pigs five and one-half months old and averaging about 100 pounds in weight. From each group 20 pigs were secured and in each case divided into four lots of five pigs each. The experiment was begun

February 17, 1920, extended over a period of 60 days, and thus closed April 17, 1920. The younger pigs are designated as lots 13 to 16, and the older pigs as lots 17 to 20. All feeds were fed separately in self-feeders. The various lots were fed as follows: Lots 13 and 17, ground corn and tankage; lots 14 and 18, ground feterita and tankage; lots 15 and 19, ground milo and tankage; and lots 16 and 20, ground kafir and tankage.

In the case of the younger pigs (Table IV, lots 13 to 16) the feeds were used primarily for growth; in the case of the older pigs (Table V, lots 17 to 20) they were used both for growing and fattening. It was to eliminate differences which might result because of varying amounts of protein supplement being required with the different grains, that each lot of pigs was self-fed by the free-choice method.

For the younger pigs a more satisfactory ration might have been made by adding wheat shorts to the grain and tankage, but since one of the objects of the experiment was to compare the use of the feeds by pigs of different ages it was necessary to feed them alike. Each of the grains used proved palatable and was relished by the pigs.

Each lot of pigs had a separate pen inside a large house with a dry dirt lot adjoining the house. The self-feeders were placed upon the concrete floor inside the house and water was given inside also. Fine granulated salt, commonly called barreled salt, was kept before the pigs.

RESULTS

The results of the experiment as regards the younger pigs are given in Table IV and as regards the older pigs in Table V.

TABLE IV.—GRAIN SORGHUMS VERSUS CORN FOR GROWING PIGS

(Pigs were about five and one-half months old at the beginning of the experiment. Feeding period, 60 days)

Lot No.	13	14	15	16
Number of pigs in lot	5	5	5	5
Average initial weight per pig	99.60	97.87	99.60	99.20
Feed required for 100 pounds gain:				
Ground corn	454.18			
Ground feterita		500.00		
Ground milo			507.22	
Ground kafir				558.54
Tankage	18.82	26.64	24.77	26.66
Total	473.00	526.64	531.99	585.20
Relative efficiency of rations in percent on basis of least feed for 100 pounds gain	100.00	89.81	88.91	80.82

To make 100 pounds gain required approximately fifty pounds more feterita or milo and seven pounds more tankage (lots 14 and 15) than were required of corn and tankage (lot 13). Kafir for these young pigs did not prove nearly so good as the other sorghums. Apparently the kafir was fully as palatable as either of the other sorghum grains and very little more tankage was used (lot 16) in making the gains than in the lots fed milo and feterita (lots 14 and 15). But the difference of more than 50 pounds greater grain consumption in the lot fed kafir puts that feed decidedly below milo and feterita for 100-pound pigs.

TABLE V.—GRAIN SORGHUMS VERSUS CORN FOR GROWING AND FATTENING PIGS

(Pigs were about nine months old at the beginning of the experiment. Feeding period, 60 days)

Lot No.	18	17	19	20
Number of pigs in lot.....	5	5	5	5
Average initial weight per pig.....	149.33	150.80	149.13	149.27
Feed required for 100 pounds gain:				
Ground feterita.....	408.98			
Ground corn.....		424.94		
Ground milo.....			453.13	
Ground kafir.....				475.57
Tankage.....	17.49	14.55	17.71	17.42
Total.....	426.47	439.49	470.84	492.99
Relative efficiency of rations in percent on basis of least feed for 100 pounds gain.....	100.00	97.03	90.57	86.50

The order in which these feeds ranked when fed to the younger pigs was changed somewhat when the grains were given the older pigs. Ground corn and ground feterita exchanged places, but there was much less difference in the amounts of these feeds required to produce 100 pounds gain on the older pigs (lots 18 and 17) than in the case of the younger pigs (lots 13 and 14).

One of the important facts shown by the uniform results with both ages of pigs is that the sorghum grains require more protein supplement than corn. The tankage necessary to make an increase in weight of 100 pounds on the lighter pigs averaged 26.02 pounds. This is 7.2 pounds more tankage than was required when corn was fed. Likewise, in the case of the older pigs as shown in Table V, approximately three pounds more tankage was needed with the sorghum grains than with corn. Younger pigs need a narrower ration because growth requires more protein than does fattening. The younger pigs receiving corn and tankage (lot 13) required to produce 100

pounds gain 4.27 pounds more tankage than the older pigs (lot 17) receiving the same ration. In the case of the grain sorghums, however, taking the average of the three lots in each group receiving grain sorghums, the younger pigs required to produce 100 pounds gain an average of 8.48 pounds more tankage than the older pigs. In case pigs are handfed this difference in protein required needs to be kept in mind if best results are to be obtained. There was no noticeable difference in the health of the pigs of the two ages.

CONCLUSIONS

1. The sorghum grains, especially milo and feterita, are nearly as good as corn for growing pigs and may possibly excel corn for fattening purposes.
2. Kafir is the least valuable of the three common sorghums.
3. More tankage is needed with sorghum grains than with corn.
4. In the case of all the 150-pound pigs, tankage represented 3.7 percent of the total feed consumed; and in the case of all the 100-pound pigs tankage represented 4.7 percent of the total feed consumed. These may be assumed to be the correct proportions for fattening pigs of these weights.
5. Feterita is more efficient than milo and milo more efficient than kafir for fattening hogs when each is supplemented with tankage.
6. Often money spent for grains to be fed hogs will give greater returns if it buys sorghum grains than if it is spent for corn.

NOTE.—For further information on the station's work in swine feeding, see circular 78, "Swine Feeding Investigations, 1918-19."

