

# AGRICULTURAL EXPERIMENT STATION

KANSAS STATE AGRICULTURAL COLLEGE  
MANHATTAN, KANSAS

DEPARTMENT OF ANIMAL HUSBANDRY



PRIZE-WINNING POLAND CHINA GILTS RAISED BY K. S. A. C.

## SWINE FEEDING INVESTIGATIONS, 1921-'22.<sup>1</sup>

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### PART IA.

#### UTILIZATION OF ALFALFA PASTURE IN FATTENING HOGS FOR MARKET.

The value of pasture for fattening hogs has been shown in a number of tests conducted at state Agricultural Experiment Stations. Forage crops are essential to profitable pork production whether it be the maintenance of the breeding herd, growing the pigs, or fattening pigs for market. With a variety of such crops to choose from there are one or more pasture crops well adapted to practically every section of the country and some forage crop is available for practically any time of the normal growing season.

1. Contribution No. 70 from the Department of Animal Husbandry.

Pigs on forage make more rapid gains than pigs in a dry lot, and continue their rate of gain during a longer period. Even if fed a well-balanced ration in a dry lot, pigs fed the same feeds on pasture will make 30 to 40 percent greater gains. If fed corn alone, pigs on forage will make nearly 100 percent greater gains than when fed corn alone in the dry lot.

Forage crops also reduce the amount of grain required to produce 100 pounds gain. Pigs on forage receiving a balanced ration of grain full-fed will require approximately 15 percent less grain than those in a dry lot. If fed corn alone the saving in corn will be practically 50 percent. The use of forage crops allows the feeder to materially reduce the amount of commercial protein feed such as tankage or shorts needed to balance the ration for growing or fattening pigs.

The most important questions arising in connection with the use of forage crops for fattening hogs are: (1) Shall self-feeders be used or shall the hogs be hand-fed? (2) Shall the amount of grain be limited, and if so, for how long? (3) If fed only a limited grain ration during part of the feeding period, what length of feeding period will be required to secure desirable market finish?

#### FEEDING PLAN.

To secure information regarding the best methods to follow in fattening pigs on pasture the Kansas Agricultural Experiment Station conducted tests on alfalfa pasture using the same grain ration for all lots, but feeding by different methods. A ration of shelled corn, wheat shorts, and tankage was used, all lots running on alfalfa pasture during the entire period of the test.

One lot of pigs (lot 1) was furnished these feeds in separate compartments of a self-feeder from the start. Another lot (lot 2) was fed the same amount of each feed by hand twice daily. A third lot received a one-half grain ration during the first 60 days and was then provided with a self-feeder during the remaining 120 days. A fourth lot was handled under a similar system of limited grain feeding for the first 120 days and then finished on a self-feeder for 60 days.

The pigs used in these tests were raised in the college herd, all being of March and April farrow. In order to secure the greatest uniformity in all the lots, they were carefully selected according to weight, age, condition, sex, and breed. The initial and final weights represent the average of weights made on three successive days at the beginning and at the end of the experiment.

RESULTS.

Table I gives results in detail:

TABLE I.—Results of a 180-day feeding experiment in the utilization of alfalfa pasture in fattening hogs.

(July 1 to December 28, 1921.)

METHOD OF FEEDING (All pigs on alfalfa pasture)	Full-fed		Hand-fed one-half grain ration first 60 days; self-fed last 120 days	Hand-fed one-half grain ration first 120 days; self-fed last 60 days
	Self-fed	Hand-fed		
Lot No. ....	1	2	3	4
Number of pigs in lot. ....	8	8	8	8
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Av. initial weight per pig. ....	39.08	39.00	38.68	38.54
Av. final weight per pig. ....	321.25	304.50	283.08	256.33
Av. daily gain per pig. ....	1.57	1.48	1.36	1.21
Av. total gain per pig. ....	282.17	265.50	244.45	217.79
Av. daily ration per pig:				
Shelled corn. ....	5.60	5.52	4.66	4.18
Wheat shorts. ....	.73	.71	.72	.47
Tankage. ....	.28	.32	.22	.15
Feed required for 100 pounds gain:				
Shelled corn. ....	357.35	374.32	343.09	345.15
Wheat shorts. ....	46.29	48.06	53.22	38.72
Tankage. ....	17.68	21.68	16.36	12.57
Total. ....	421.32	444.06	412.67	396.44

DISCUSSION.

The pigs in lot 1 (fig. 1) which were self-fed corn, wheat shorts, and tankage from the start made faster daily gains and greater total gains than the pigs in lot 2 receiving the same ration fed by hand. The self-fed pigs produced 100 pounds of pork on 23 pounds less feed than the hand-fed lot and averaged 17 pounds greater gain during the fattening period. Based on these results it can be concluded that pigs which are full-fed on pasture will be ready for market somewhat earlier and make somewhat more economical gains if the ration is supplied in a self-feeder instead of being fed by hand twice daily.

Lots 3 and 4 were restricted to a one-half grain ration during the first part of the feeding period, for 60 days and 120 days, respectively, and then put on self-feeders to finish for market. Both lots made slower gains than the full-fed lots, but required somewhat less grain to produce 100 pounds gain. Compared to lot 1 which was self-fed from the start, lot 3 receiving a one-half grain ration for 60 days, followed by self-feeding for 120 days, saved only 9 pounds of feed in producing 100 pounds of pork, and lot 4 half-fed for 120 days, then self-fed for the remaining 60 days of the experi-

ment, saved only 25 pounds of grain per 100 pounds of pork produced. Handled under either of these systems of limited grain feeding, market weight cannot be secured as soon as when full-feeding is practiced, neither can a desirable market finish be secured as quickly, since practically full grain feeding is necessary for a time before hogs are marketed.



FIG. 1.—The pigs in lot 1 ready for market.

PART IB.

FEEDING PERIOD NECESSARY TO FATTEN HOGS ON ALFALFA PASTURE.

A limited grain ration on alfalfa pasture will not furnish the available nutrients required to finish hogs for market. From 30 to 60 days of full grain feeding before marketing is necessary in order to secure desirable market finish. The length of feeding period required to finish hogs for market under various systems of feeding on pasture is shown by the results given in Table II.

TABLE II.—Results of feeding experiment showing length of feeding period required to finish hogs for market on alfalfa pasture.

(Experiment began July 1, 1921.)

METHOD OF FEEDING (All pigs on alfalfa pasture)	Full-fed		Hand-fed one-half grain ration first 60 days; self-fed last 90 days	Hand-fed one-half grain ration first 120 days; self-fed last 60 days
	Self-fed	Hand-fed		
Lot No. ....	1	2	3	4
Number of pigs in lot .....	8	8	8	8
Number of days on experiment .....	120	120	150	180
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Av. initial weight per pig .....	39.08	39.00	38.63	38.54
Av. final weight per pig .....	213.13	199.00	232.38	256.33
Av. daily gain per pig .....	1.45	1.33	1.29	1.21
Av. total gain per pig .....	174.05	160.00	193.75	217.79
Av. daily ration per pig:				
Shelled corn .....	4.45	4.25	4.03	4.18
Wheat shorts .....	.56	.49	.66	.47
Tankage .....	.26	.26	.22	.15
Feed required for 100 pounds gain:				
Shelled corn .....	306.82	318.71	311.76	345.15
Wheat shorts .....	38.58	37.05	51.43	38.72
Tankage .....	18.21	19.69	17.28	12.57
Total .....	363.61	375.45	380.47	396.44

DISCUSSION.

Lots 1 and 2 which were full-fed from the start were ready for market after four months feeding, the pigs averaging 213 pounds in the self-fed lot and 199 pounds in the lot fed by hand. Lot 3 which received a one-half grain ration during the first 60 days required five months feeding to finish, averaging at that time 232 pounds. Lot 4 which were one-half grain fed for 120 days were not fat enough for market until six months after being started, averaging at that time, 256 pounds. Less feed was required to produce 100 pounds gain in the lots which were full-fed from the start, due to the fact that these pigs could be marketed younger, and at the younger

age had required less feed to produce 100 pounds gain. It must be kept in mind however that the pigs which received a limited grain ration during the summer produced a greater part of their gain on the new corn crop, and therefore on cheaper feed.

In analyzing the results of these tests several factors must be kept in mind in addition to rate of gain and amount of grain required to produce 100 pounds gain. Spring pigs which are crowded through and marketed as early as possible take advantage of the higher market price for hogs which generally holds during the late summer and early fall months. On the average the market price per hundred for hogs in September and October is from one to one and one-half dollars higher than in November and December. However, in order to fatten hogs for this higher market price the feeder must rely mainly on the past season's corn crop. When a system of limited grain feeding is followed during the summer months the pigs will make good growth on pasture and be in good shape to finish rapidly either by hogging down corn or feeding the new crop. For the hog raiser who has to purchase corn during the summer it would usually be advisable to feed only a limited grain ration, and finish his hogs when he can buy the new crop cheaper. But with plenty of corn on hand and a good market for hogs it would doubtless be advisable to full-feed. This method allows the use of self-feeders from the time the pigs are weaned until they are ready for market.

**PART II.**

**CORN VERSUS CANE SEED FOR FATTENING PIGS.**

Sweet sorghum, or cane, is commonly grown for a silage crop in the southwestern states, but has not been used extensively as a grain crop. However, the seed, threshed or in the head, is eaten readily by livestock. In sections receiving too little rainfall to insure a satisfactory corn crop, the sweet sorghums will produce a much heavier yield of grain than will corn. The seed when ground has proved a satisfactory substitute for corn in fattening hogs and cattle. In order to secure more information regarding the feeding value of cane seed, a test was conducted comparing cane seed, both ground and whole, with yellow corn and white corn.

**FEEDING PLAN.**

Four lots of pigs were used, being fed, respectively, whole cane seed, ground cane seed, white corn, and yellow corn, the grain being supplemented by tankage in each lot. In order to determine definitely the relative feeding value in each case, the pigs were fed exactly the same amount of both grain and tankage in each lot at each feeding, all lots being fed by hand twice daily. The pigs were carefully selected for each lot as to size, age, condition, breed, and sex; were fed exactly the same amount of each feed during the entire period of 120 days; and thus this test gives a reliable comparison of the feeds used. The amount of feed given each lot daily was determined by the amount the pigs in the lot receiving white corn would eat. The pigs in this lot were given all the grain they would consume. At any and all times during the test the pigs in the other three lots, receiving whole cane, ground cane, and yellow corn, respectively, would have eaten more grain.

**RESULTS.**

Table III gives the results in detail:

TABLE III.—Results of a 120-day feeding experiment showing the relative value of corn and cane seed for fattening pigs.

(January 1 to May 1, 1922.)

Lot No. ....	1	2	3	4
Number of pigs in lot. ....	8	8	8	8
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Av. initial weight per pig. ....	66.46	66.92	66.10	66.54
Av. final weight per pig. ....	162.21	176.79	204.72	208.83
Av. daily gain per pig. ....	.80	.92	1.16	1.19
Av. total gain per pig. ....	95.75	109.87	138.62	142.29
Av. daily ration per pig:				
Whole cane seed. ....	4.39			
Ground cane seed. ....		4.39		
Shelled white corn. ....			4.39	
Shelled yellow corn. ....				4.39
Tankage. ....	.44	.44	.44	.44
Feed required for 100 pounds gain:				
Whole cane seed. ....	550.39			
Ground cane seed. ....		479.64		
Shelled white corn. ....			380.19	
Shelled yellow corn. ....				370.36
Tankage. ....	55.61	48.46	38.18	37.42
Total. ....	606.00	528.10	418.37	407.78
Relative efficiency of grain fed based on the amt. of grain required for 100 pounds gain.	<i>Percent</i> 67.29	<i>Percent</i> 77.22	<i>Percent</i> 97.41	<i>Percent</i> 100.00

**DISCUSSION**

Whole cane seed proved to be the least valuable in producing gain per unit of grain fed.

Grinding cane seed increased its pork producing value 15 percent.

It required 25 percent more ground cane seed than shelled corn to produce 100 pounds of pork. It must be kept in mind that neither lot receiving cane seed was fed as much as the pigs would have consumed. Had both lots receiving cane seed been full-fed the daily gains would have been more nearly equal to the daily gains made by the pigs receiving corn.

The difference in efficiency of white and yellow corn for fattening pigs is slight as indicated by the results of this test. However, if the pigs receiving yellow corn had been full-fed, a greater difference might have been shown.

The pigs receiving yellow corn appeared to be more vigorous at the close of the test than those receiving white corn. This difference was indicated by the smoother coats and somewhat better general appearance of the yellow corn lot.

Both lots receiving corn made satisfactory gains and were finished for market at the end of 120 days. The lots receiving cane seed were



still too thin to be marketed but were well grown, thrifty, and in good shape to make further gains.

Cane seed, particularly if ground is a satisfactory grain for fattening hogs, but more cane seed than corn is required to produce satisfactory gains and market finish.

Like corn, cane seed should be fed with a protein supplement.

PART III.

ALFALFA VERSUS SUDAN GRASS AS A PASTURE IN MAINTAINING BROOD SOWS

During the summer of 1921 a test was carried on with brood sows on pasture, one lot of sows being on Sudan grass pasture and another on alfalfa pasture. Each lot received a light ration of corn with the addition of a small amount of tankage during the last 30 days of the test. The objects of this test were, first, to determine the relative value of Sudan grass and alfalfa pasture for maintaining brood sows; and second, to determine the amount of grain necessary to maintain the weight of brood sows on the pastures used. The sows were carefully selected for each lot to avoid any possible differences in the results of the test due to individuality, age, or breed.

FEEDING PLAN.

The test covered a period of 60 days, from July 1 to August 30, 1921. The sows at the beginning of the test were in good flesh; consequently, only enough grain was fed to practically maintain their weight. Grain was fed twice daily, each lot receiving exactly the same amount. Tankage was fed during the last 30 days, the sows receiving an average of one-fourth pound of tankage each per day during this time. Results in detail are given in Table IV.

TABLE IV.—Results of a 60-day experiment showing the relative value of alfalfa pasture and Sudan grass pasture in maintaining brood sows.

(July 1 to August 30, 1921.)

Lot No. ....	1 5	2 5
Number of sows in lot .....	Sudan grass	Alfalfa
Kind of pasture .....		
Av. initial weight per sow .....	459.87 lbs.	458.13 lbs.
Av. final weight per sow .....	448.27 lbs.	453.47 lbs.
Av. total loss in weight per sow .....	11.60 lbs.	4.66 lbs.
Av. daily ration per sow:		
Shelled corn .....	1.19 lbs.	1.19 lbs.
Tankage .....	.13 lbs.	.13 lbs.
Pasture .....	Sudan grass	Alfalfa
Total .....	1.32 lbs.	1.32 lbs.

DISCUSSION.

The sows in both lots did well throughout the test and showed no noticeable differences in health or appetites. At the close of the test the sows were in good condition to farrow, and farrowed strong litters. No differences were noted in the pigs farrowed by the sows in either lot at the time of farrowing or at any time later. Both

Sudan grass and alfalfa pasture proved entirely satisfactory and apparently were equally well liked.

Sudan grass pasture proved practically equal to alfalfa pasture for brood sows, the sows on alfalfa showing an average loss in weight during the period of 60 days of 4.67 pounds against a loss of 11.60 pounds per sow for the lot on Sudan grass pasture.

Sows which averaged approximately 460 pounds in weight were maintained in good condition during July and August on pasture with the addition of 1.19 pounds of corn and 0.13 of a pound of tankage per sow per day.

Sudan grass is a very valuable supplementary pasture even though alfalfa is the main pasture crop for hogs, since Sudan grass makes a much more rapid growth during the hot dry months.

Sudan grass is a satisfactory substitute for alfalfa pasture being well adapted to many sections where alfalfa cannot be grown successfully.

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NOTE.—For further information on the station's recent work on swine feeding, see Circular 78, "Swine Feeding Investigations, 1918-'19," and Circular 89, "Swine Feeding Investigations, 1919-'20," copies of which may be secured, as long as available, by making request of AGRICULTURAL EXPERIMENT STATION, K. S. A. C., MANHATTAN, KAN.

