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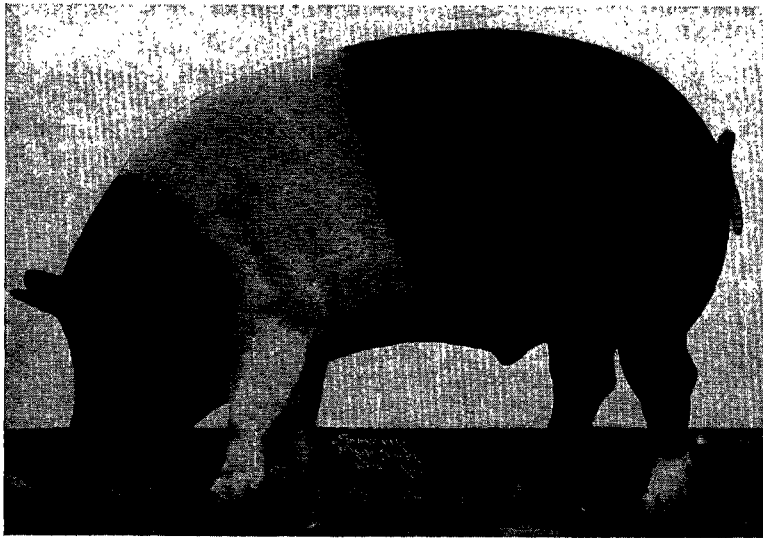
CIRCULAR 188

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KANSAS STATE COLLEGE OF AGRICULTURE
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MANHATTAN, KANSAS

DEPARTMENT OF ANIMAL HUSBANDRY



HAMPSHIRE BARROW, K. S. C. PERFECTION

*Grand Champion Over All Breeds, American Royal Livestock Show, 1930.
Fitted and Shown by Kansas State College.*

SWINE FEEDING INVESTIGATIONS, 1930 TO 1935¹

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Six swine-feeding problems studied by the Kansas Agricultural Experiment Station from 1930 to 1935 are reported in this circular: (I) The relative value of various protein supplements and protein supplementary mixtures for fattening swine. (II) Corn versus wheat for fattening hogs. (III) The desirability of restricting tankage in the ration of fattening pigs when self-fed corn. (IV) Alfalfa pasture feeding versus dry lot feeding for fattening spring pigs. (V) Separation of the grain feed for fattening pigs. (VI) Soiling alfalfa for fattening pigs.

1. Contribution No. 128 from the Department of Animal Husbandry.

The pigs used in the tests providing information on these problems were raised in the college herd. In order to secure the greatest uniformity in all the lots, selection was carefully made 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.

I. THE RELATIVE VALUE OF VARIOUS PROTEIN SUPPLEMENTS AND PROTEIN SUPPLEMENTARY MIXTURES FOR FATTENING SWINE

One of the basic facts of swine feeding is that a protein supplement must be used if pork is to be produced economically. The protein supplement most commonly used in Kansas to supplement the grain ration is tankage. It is especially well suited for hog feeding, for it has a high percentage of protein. But since the price of tankage is usually much higher than other protein supplementary feeds, many feeders believe that it is too expensive and that other protein feeds may be used just as well because they are cheaper in price.

Because of such beliefs the Kansas Agricultural Experiment Station has conducted a number of experiments in the last few years to determine the value of a number of high-protein-content feeds and mixtures of such feeds as substitutes for tankage.

Five swine-feeding problems comprised this group of experiments which were studied at this station from 1930 to 1935: 1. Tankage versus cottonseed meal and linseed meal. 2. Tankage and alfalfa hay versus tankage and alfalfa meal and alfalfa leaf meal. 3. Tankage and alfalfa hay and meal versus tankage and sweet clover hay and meal. 4. Tankage versus semisolid buttermilk. 5. Digester tankage versus meat scraps.

1. TANKAGE VERSUS COTTONSEED MEAL AND LINSEED MEAL

Many inquiries have been received regarding the possibility of substituting cottonseed meal and linseed meal partly or wholly for tankage as a protein supplement for hogs when self-fed corn. Two tests are reported in this circular concerning this problem.

First Test.—The first of these tests was conducted during the winter of 1930-'31 in dry lot. The pigs in this test had free access to shelled corn and a protein supplement mixture of tankage and linseed meal or cottonseed meal in various proportions. Where alfalfa hay was fed, the pigs were allowed free access to it. One lot of pigs (lot 2) in this test received as their protein supplement the Trinity Mixture, that is, tankage $\frac{1}{2}$ linseed meal $\frac{1}{4}$, and alfalfa meal $\frac{1}{4}$. This experiment is reported in detail in Table I.

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TABLE I—TANKAGE VERSUS LINSEED MEAL AND COTTONSEED MEAL FOR FATTENING PIGS SELF-FED CORN IN THE DRY LOT.

(December 31, 1930, to March 31, 1931—90 days)

RATION.	Corn (self-fed).			
	Tankage (self-fed), alfalfa hay (self-fed).	Tankage $\frac{1}{2}$, linseed meal $\frac{1}{4}$, alfalfa meal $\frac{1}{4}$ (self-fed).	Tankage $\frac{2}{3}$, linseed meal $\frac{1}{3}$ (self-fed), alfalfa hay (self-fed).	Tankage $\frac{2}{3}$, cottonseed meal $\frac{1}{3}$ (self-fed), alfalfa hay (self-fed).
Lot No.....	1	2	3	4
Number of pigs per lot.....	9	8	9	9
Av. initial weight per pig.....	<i>Pounds.</i> 71.19	<i>Pounds.</i> 72.42	<i>Pounds.</i> 70.70	<i>Pounds.</i> 71.30
Av. final weight per pig.....	220.78	230.75	217.00	217.89
Av. total gain per pig.....	149.59	158.33	146.30	146.59
Av. daily gain per pig.....	1.66	1.76	1.63	1.63
Av. daily ration per pig:				
Corn.....	6.09	5.94	5.87	5.75
Tankage.....	.63	.46	.50	.46
Linseed meal.....		.28	.25	
Cottonseed meal.....				.23
Alfalfa meal.....		.23		
Alfalfa hay.....	.31		.25	.29
Feed required for 100 pounds gain:				
Corn.....	366.33	337.55	361.05	352.83
Tankage.....	37.73	26.18	30.64	28.04
Linseed meal.....		13.09	15.32	
Cottonseed meal.....				14.02
Alfalfa meal.....		13.09		
Alfalfa hay.....	18.64		15.50	17.51

Observations

1. The differences in daily gains in the different lots were small and scarcely significant. The lot receiving the Trinity Mixture, however, made the largest daily gains. There were no differences in the daily gains between the lots that received a protein supplement mixture of $\frac{2}{3}$ tankage and $\frac{1}{3}$ linseed meal, and $\frac{2}{3}$ tankage and $\frac{1}{3}$ cottonseed meal. The pigs on these mixtures produced daily gains very little under those produced by the pigs fed tankage alone.

2. The best showing in the amount of feed consumed for 100 pounds gain was made by the Trinity Mixture fed pigs. The amounts consumed by the pigs in the other lots differed very little.

3. It should be remembered, however, that where mixtures are made of several protein feeds more labor is required in preparing it than when a single protein supplement is fed. This fact should be kept in mind when the costs of gains are considered.

Second Test.—The second test comparing the relative value of tankage, cottonseed meal, and linseed meal as protein supplements for pigs self-fed corn was conducted during the summer of 1931. These pigs were fed on alfalfa pasture, and the protein supplements were self-fed. They were mixed and fed in the different lots as in-

icated in the following table. The results in detail are given in Table II.

TABLE II.—TANKAGE VERSUS COTTONSEED MEAL AND LINSEED MEAL FOR FATTENING PIGS SELF-FED CORN ON ALFALFA PASTURE.

(June 22 to October 20, 1931—120 days)

RATION.	Corn (self-fed), alfalfa pasture.				
	Tankage (self-fed).	Tankage $\frac{1}{2}$, cottonseed meal $\frac{1}{2}$ (self-fed).	Cottonseed meal $\frac{1}{2}$, linseed meal $\frac{1}{2}$ (self-fed).	Tankage $\frac{1}{3}$, cottonseed meal $\frac{1}{3}$, linseed meal $\frac{1}{3}$ (self-fed).	Tankage $\frac{2}{3}$, linseed meal $\frac{1}{3}$ (self-fed).
Lot No.....	1	2	3	4	5
Number of pigs per lot.....	10	10	10	10	10
Av. initial weight per pig.....	<i>Pounds.</i> 61.97	<i>Pounds.</i> 63.00	<i>Pounds.</i> 63.17	<i>Pounds.</i> 62.80	<i>Pounds.</i> 62.53
Av. final weight per pig.....	256.37	262.13	175.63	252.70	263.27
Av. total gain per pig.....	194.40	199.13	112.46	190.10	200.74
Av. daily gain per pig.....	1.62	1.66	.94	1.58	1.87
Av. daily ration per pig:					
Corn.....	5.20	5.28	3.37	4.96	5.39
Tankage.....	.21	.16	.....	.13	.18
Cottonseed meal.....	.....	.16	.10	.13	.....
Linseed meal.....	.....	.....	.10	.13	.09
Feed required for 100 pounds gain:					
Corn.....	320.73	318.23	360.04	313.15	322.31
Tankage.....	13.22	8.54	.....	8.08	10.40
Cottonseed meal.....	.....	8.54	10.05	8.08	.....
Linseed meal.....	.....	.....	10.05	8.08	5.21

Observations

1. There was no significant difference in either the daily gains or the feed required to make 100 pounds of gain in the lots where tankage was used alone or as a part of the protein supplement.

2. These results emphasize the fact that tankage alone was not materially improved as a protein supplement for hogs that are being fattened on good alfalfa pasture by mixing either linseed meal or cottonseed meal with it.

3. The value of tankage as a protein supplement in a ration for hogs being fattened for market on good alfalfa pasture is further indicated by comparing lots 2 and 3. In lot 2, tankage and cottonseed meal were mixed half and half. In lot 3, linseed meal and cottonseed meal were mixed half and half. The daily gains were nearly 80 percent greater in lot 2, where tankage and cottonseed meal were fed, than in lot 3, where linseed meal and cottonseed meal were fed.

4. Further evidence of the value of tankage is seen in a comparison of lots 4 and 5. It will be noted that in lot 4, receiving $\frac{1}{3}$ tankage, $\frac{1}{3}$ cottonseed meal, and $\frac{1}{3}$ linseed meal as a protein supplement, the daily gains were smaller than in lot 5, receiving $\frac{2}{3}$ tankage and $\frac{1}{3}$ linseed meal as a protein supplement.

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Conclusions

It would seem from a study of these tests that:

1. Linseed meal or cottonseed meal fed alone or mixed half and half is decidedly inferior to tankage as a protein supplement to hog feeding rations.
2. Hogs receiving a protein supplement of tankage and cottonseed meal or linseed meal in which the tankage is two thirds of the mixture or better make as satisfactory daily gains and as efficient utilization of feed for 100 pounds gain as hogs that received tankage alone.

2. TANKAGE AND ALFALFA HAY VERSUS TANKAGE AND ALFALFA MEAL AND ALFALFA LEAF MEAL

The increasing popularity of feed grinders for preparing feed for livestock feeding and the increase in the availability of commercially ground alfalfa meal and leaf meal has brought many inquiries as to the relative efficiency of these meals, when compared with alfalfa hay, for swine feeding. As a result, the Kansas Agricultural Experiment Station conducted four tests to secure information on this problem. These tests are reported in this circular.

First Test.—The first test was conducted during the winter of 1930-'31 with pigs self-fed corn in the dry lot. Lot 1 received, in addition, tankage and alfalfa hay self-fed. Lot 2 received their alfalfa as meal, which helped make up the protein supplement by being mixed one part to three parts of tankage. The results are reported in detail in Table III.

TABLE III.—TANKAGE AND ALFALFA HAY VERSUS TANKAGE AND ALFALFA MEAL FOR FATTENING PIGS SELF-FED CORN IN THE DRY LOT.
 (December 31, 1930, to March 31, 1931—90 days)

RATION.	Corn (self-fed).	
	Tankage (self-fed). alfalfa hay (self-fed).	Tankage $\frac{2}{3}$, alfalfa meal $\frac{1}{3}$ (self-fed).
Lot No.	1	2
Number of pigs per lot.	9	9
Av. initial weight per pig.	<i>Pounds.</i> 71.19	<i>Pounds.</i> 71.22
Av. final weight per pig.	220.78	219.66
Av. total gain per pig.	149.59	148.34
Av. daily gain per pig.	1.66	1.65
Av. daily ration per pig:		
Corn.	6.09	6.08
Tankage. ....	.63	.42
Alfalfa hay. ....	.31	.....
Alfalfa meal. ....	.....	.14
Feed required for 100 pounds gain:		
Corn.	366.33	369.05
Tankage.	37.73	25.80
Alfalfa hay.	18.64	.....
Alfalfa meal. ....	.....	8.60

Observations

1. There was practically no difference in the daily gains by the pigs in the two lots.

2. The most efficient utilization of feed for 100 pounds gain was made by the pigs that received alfalfa meal mixed with their tankage in the proportion of 3 parts tankage, 1 part alfalfa meal. Much less protein supplement was consumed by the alfalfa meal fed pigs.

Second Test.—A second test was conducted in the summer of 1933 with pigs self-fed corn in the dry lot. Three lots of pigs were fed in this test. One lot received a ration of tankage and alfalfa hay self-fed with their corn; a second lot was self-fed a protein mixture of tankage, 3 parts; alfalfa-leaf meal, 1 part; and a third lot was self-fed a mixture of tankage, 3 parts; and alfalfa meal, 1 part. The results in detail are given in Table IV.

TABLE IV.—TANKAGE AND ALFALFA HAY VERSUS TANKAGE AND ALFALFA MEAL AND ALFALFA LEAF MEAL FOR PIGS SELF-FED CORN IN THE DRY LOT.

(June 27 to October 5, 1933—100 days)

RATION	Corn (self-fed).		
	Tankage (self-fed), alfalfa hay (self-fed).	Tankage $\frac{3}{4}$, alfalfa leaf meal $\frac{1}{4}$ (self-fed).	Tankage $\frac{3}{4}$, alfalfa meal $\frac{1}{4}$ (self-fed).
Lot No.	1	2	3
Number of pigs per lot.	10	10	9
Av. initial weight per pig.	<i>Pounds.</i> 85.10	<i>Pounds.</i> 85.50	<i>Pounds.</i> 85.33
Av. final weight per pig.	228.70	221.37	210.70
Av. total gain per pig.	143.60	135.87	125.37
Av. daily gain per pig.	1.44	1.36	1.25
Av daily ration per pig:			
Corn.	5.19	4.68	4.86
Tankage. ....	.46	.34	.32
Alfalfa hay. ....	.14		
Alfalfa meal. ....			.11
Alfalfa-leaf meal. ....		.11	
Feed required for 100 pounds gain:			
Corn.	361.49	344.89	388.44
Tankage.	32.10	25.28	25.72
Alfalfa hay.	9.61		
Alfalfa meal.			8.57
Alfalfa-leaf meal.		8.43	

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Observations

1. The daily gain was the greatest in the lot receiving tankage and alfalfa hay free choice; the next largest gains were in the lots receiving tankage and alfalfa-leaf meal in the proportion of 3 parts to 1; the lot receiving tankage and alfalfa meal in the proportion of 3 parts to 1 made the least gain.

2. Less corn was required per 100 pounds gain in the lot receiving tankage 3 parts and alfalfa-leaf meal 1 part than in any of the other lots. The lot receiving tankage 3 parts and alfalfa meal 1 part consumed the most corn per 100 pounds gain. The smallest amount of protein supplement per 100 pounds gain was consumed by the pigs fed alfalfa-leaf meal and tankage.

Third Test.—A third test was conducted during the winter of 1932. Six lots were used in this test. The pigs were all self-fed corn in the dry lot. In lot 1 the alfalfa hay was self-fed. In the other lots different proportions of tankage and alfalfa meal or alfalfa-leaf meal were self-fed as mixtures as indicated in the following table. Lot 6 was fed the Trinity Mixture. The detailed results are given in Table V.

TABLE V.—TANKAGE AND ALFALFA HAY VERSUS TANKAGE AND ALFALFA MEAL AND ALFALFA LEAF MEAL FOR FATTENING PIGS SELF-FED CORN IN THE DRY LOT.

(January 21 to May 12, 1932—112 days)

RATION.	Corn (self-fed).					
	Tankage (self-fed). alfalfa hay (self-fed).	Tankage $\frac{3}{4}$ alfalfa meal $\frac{1}{4}$ (self-fed).	Tankage $\frac{1}{2}$ alfalfa meal $\frac{1}{2}$ (self-fed).	Tankage $\frac{3}{4}$ alfalfa leaf meal $\frac{1}{4}$ (self-fed).	Tankage $\frac{1}{2}$ alfalfa leaf meal $\frac{1}{2}$ (self-fed).	Tankage $\frac{1}{2}$ linseed meal $\frac{1}{4}$ alfalfa meal $\frac{1}{4}$ (self-fed).
Lot No.	1	2	3	4	5	6
Number of pigs per lot...	9	7	7	8	8	8
Av. initial weight per pig.	Pounds. 95.07	Pounds. 98.71	Pounds. 98.38	Pounds. 97.00	Pounds. 97.50	Pounds. 94.79
Av. final weight per pig..	298.82	294.8	285.48	301.00	282.83	289.33
Av. total gain per pig....	203.75	196.15	187.10	204.00	185.33	194.54
Av. daily gain per pig....	1.82	1.75	1.67	1.82	1.65	1.74
Av. daily ration per pig:						
Corn	7.29	7.31	6.78	7.26	6.64	6.97
Tankage .....	.39	.33	.27	.37	.27	.30
Alfalfa hay .....	.51					
Alfalfa meal .....		.11	.27			.15
Alfalfa-leaf meal .....				.12	.27	
Linseed meal .....						.15
Feed required for 100 pounds gain:						
Corn	400.75	417.65	405.63	398.77	401.08	401.36
Tankage	21.62	18.91	16.23	20.34	16.35	17.11
Alfalfa hay	28.30					
Alfalfa meal		6.31	16.23			8.55
Alfalfa-leaf mea				6.78	16.35	
Linseed meal						8.55

Observations

1. From the standpoint of daily gains it will be noted: That the daily gains made where tankage was supplemented with alfalfa hay free choice were the same as those where tankage was supplemented with alfalfa-leaf meal on a 3-to-1 basis. That the daily gains were approximately the same where tankage and alfalfa meal, and tankage and alfalfa-leaf meal were fed on a 1-to-1 basis. That daily gains were slightly greater where tankage and alfalfa-leaf meal were fed on a 3-to-1 basis than where tankage and alfalfa meal were fed on this same basis.

2. It will be noted that there was no significant difference in the value of these supplements from the standpoint of corn required to produce 100 pounds of gain. The largest requirement to produce 100 pounds of gain was only 4½ percent greater than the smallest.

3. The so-called Trinity Mixture, consisting of tankage 50 percent, linseed meal 25 percent, and alfalfa meal 25 percent, proved to be less satisfactory from the standpoint of rapidity of gains than either tankage and alfalfa hay fed free choice, or tankage 75 percent and alfalfa-leaf meal 25 percent. There was comparatively little difference in the economy of gain in the entire experiment, but with regard to the small difference that did exist, the Trinity Mixture ranked fourth in this respect.

4. It is significant that increasing either the alfalfa meal or the alfalfa-leaf meal portion of the supplement fed from 25 percent to 50 percent, decreased the gains, probably due to the fact that the added bulk decreased the corn consumed.

5. Everything considered, tankage 75 percent and alfalfa-leaf meal 25 percent proved to be slightly more satisfactory than any other combination used, but this combination was closely followed by tankage and alfalfa hay free choice.

Fourth Test.—A fourth test was conducted during the winter of 1933 with pigs self-fed corn in the dry lot. The pigs were self-fed their protein mixtures, including their alfalfa hay. The protein feeds were mixed and fed in the different lots as indicated in the following table. The detailed results are given in Table VI.

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TABLE VI.—TANKAGE AND ALFALFA HAY VERSUS TANKAGE AND ALFALFA MEAL AND ALFALFA LEAF MEAL FOR FATTENING PIGS SELF-FED CORN IN THE DRY LOT.

(January 2 to April 24, 1933—112 days)

RATION.	Corn (self-fed).			
	Tankage (self-fed), alfalfa hay (self-fed).	Tankage $\frac{3}{4}$, alfalfa-leaf meal $\frac{1}{4}$ (self-fed).	Tankage $\frac{3}{4}$, alfalfa meal $\frac{1}{4}$ self-fed).	Tankage $\frac{1}{2}$, alfalfa-leaf meal $\frac{1}{2}$ (self-fed).
Lot No.	1	2	3	4
Number of pigs per lot.	8	8	8	8
Av. initial weight per pig.	<i>Pounds.</i> 56.75	<i>Pounds.</i> 56.67	<i>Pounds.</i> 57.17	<i>Pounds.</i> 57.04
Av. final weight per pig.	209.00	233.13	224.33	223.54
Av. total gain per pig.	152.25	176.46	167.16	166.50
Av. daily gain per pig.	1.36	1.58	1.49	1.49
Av. daily ration per pig:				
Corn.	4.56	5.73	5.47	5.51
Tankage. ....	.51	.47	.30	.48
Alfalfa hay. ....	.20			
Alfalfa meal. ....			.10	
Alfalfa-leaf meal. ....		.16		.08
Feed required for 100 pounds gain:				
Corn.	335.14	363.82	366.71	370.50
Tankage.	37.69	29.75	20.30	32.50
Alfalfa hay.	14.41			
Alfalfa meal.			6.77	
Alfalfa-leaf meal.		9.92		5.42

Observations

1. The daily gains were less in the lot receiving tankage and alfalfa hay free choice than in any of the lots receiving a mixed protein supplement of tankage and alfalfa meal or alfalfa-leaf meal. The lot receiving a protein supplement of tankage 3 parts and alfalfa-leaf meal 1 part made the greatest daily gain, 1.58 pounds. Decreasing the percentage of alfalfa-leaf meal in the mixture decreased the daily gains to 1.49 pounds. This gain was the same as in lot 3 where the mixture was tankage 3 parts and alfalfa meal 1 part.

2. Less corn was required per 100 pounds gain in the lot receiving tankage and alfalfa hay free choice than in any of the lots receiving a mixed protein supplement of tankage and alfalfa meal or alfalfa-leaf meal. The amount of corn required per 100 pounds gain was practically the same in all the lots that received as a protein supplement a mixture of tankage and alfalfa meal or alfalfa-leaf meal. More protein supplement, tankage, and alfalfa hay was required per 100 pounds gain in the lot receiving tankage and alfalfa hay free choice than in any of the lots receiving tankage and the alfalfa meals as a mixture.

3. TANKAGE AND ALFALFA HAY AND MEAL VERSUS TANKAGE AND SWEET-CLOVER HAY AND MEAL

Sweet-clover hay is quite similar to alfalfa hay with respect to its feeding value for livestock. Many farmers for different reasons grow sweet clover, and frequently find themselves with supplies of the hay on hand. They have inquired as to its value as a substitute for alfalfa hay for hog-feeding purposes. Hence the reason for the test reported in this circular. This test was conducted during the winter of 1933-'34 with pigs in the dry lot. The pigs were all self-fed corn. In two lots the pigs were self-fed tankage in addition to their grain, and allowed free access to either alfalfa hay or sweet-clover hay. In two other lots the hay was ground and self-fed as a mixture with tankage 3 parts and the meal 1 part. The detailed results are given in Table VII.

TABLE VII.—TANKAGE AND ALFALFA HAY AND MEAL VERSUS TANKAGE AND SWEET-CLOVER HAY AND MEAL FOR FATTENING PIGS SELF-FED CORN IN THE DRY LOT.

(December 18, 1933, to April 20, 1934—128 days)

RATION.	Corn (self-fed)			
	Tankage (self-fed), alfalfa hay (self-fed).	Tankage, sweet-clover hay (self-fed).	Tankage $\frac{3}{4}$, alfalfa meal $\frac{1}{4}$ (self-fed).	Tankage $\frac{3}{4}$, sweet-clover meal $\frac{1}{4}$ (self-fed).
Lot No.	1	2	3	4
Number of pigs per lot.....	10	10	8	10
Av. initial weight per pig.....	<i>Pounds.</i> 48.53	<i>Pounds.</i> 48.63	<i>Pounds.</i> 48.83	<i>Pounds.</i> 48.50
Av. final weight per pig.....	246.97	233.43	226.75	233.30
Av. total gain per pig.....	198.44	184.80	177.92	184.80
Av. daily gain per pig.....	1.55	1.44	1.39	1.44
Av. daily ration per pig:				
Corn.....	5.39	5.00	5.08	4.96
Tankage.....	.52	.55	.45	.51
Alfalfa hay.....	.60			
Sweet-clover hay.....		.53		
Alfalfa meal.....			.15	
Sweet-clover meal.....				.17
Feed required for 100 pounds gain:				
Corn.....	347.38	346.69	365.44	343.51
Tankage.....	33.56	37.88	32.05	35.39
Alfalfa hay.....	38.89			
Sweet-clover hay.....		36.74		
Alfalfa meal.....			10.68	
Sweet-clover meal.....				11.80

Observations

1. The lot receiving alfalfa hay made the largest daily gains, thus showing its superiority over the lot receiving sweet-clover hay and the lots receiving the mixtures of alfalfa meal or sweet-clover meal mixed three parts tankage to one of the meal. Of the two lots receiving one part of meal mixed with three parts of tankage, the lot receiving sweet-clover meal made a little the larger daily gains.

2. More corn was required per 100 pounds gain in the lot receiving tankage three parts and alfalfa meal one part than in any of the other lots. There was no significant difference in the amount of corn required per 100 pounds gain in the other three lots. There was little difference in the consumption of the protein supplements per 100 pounds gain in the lots receiving the hays, and again little difference in the lots receiving meals. However, both lots fed hay consumed, per 100 pounds gain, much more hay than the lots receiving meal consumed meal.

4. TANKAGE VERSUS SEMISOLID BUTTERMILK

Many inquiries have been received by the Kansas Agricultural Experiment Station relative to the value of semisolid buttermilk as a supplement to corn for hog-feeding purposes. As a result, a test was conducted in the summer of 1935. Two lots of pigs were fed on alfalfa pasture. The shelled corn in lot 1 was soaked 24 hours in water and hand-fed twice daily according to appetite. The tankage was self-fed. The shelled corn in lot 2 was soaked 24 hours in a mixture of buttermilk and enough water to cover the corn. The corn was fed according to appetite and the buttermilk was fed at the rate of one half pound per pig per day. The detailed results of the test are given in Table VIII.

TABLE VIII.—TANKAGE VERSUS SEMISOLID BUTTERMILK FOR FATTENING PIGS FED SOAKED CORN ON ALFALFA PASTURE.
 (June 1 to September 20, 1935—120 days)

RATION.	Soaked shelled corn (hand-fed), alfalfa pasture.	
	Tankage, (self-fed).	Semisolid buttermilk, (hand-fed).
Lot No.	1	2
Number of pigs per lot.	10	9
	<i>Pounds.</i>	<i>Pounds.</i>
Av. initial weight per pig.	58.90	60.85
Av. final weight per pig.	250.83	207.59
Av. total gain per pig.	191.93	146.74
Av. daily gain per pig.	1.60	1.22
Av. daily ration per pig:		
Soaked shelled corn.	5.35	4.52
Tankage. ....	.27	.49
Semisolid buttermilk.		
Feed required for 100 pounds gain:		
Soaked shelled corn.	334.76	369.95
Tankage.	17.14	
Semisolid buttermilk.		39.87

Observtions

The pigs receiving their protein supplement as semisolid buttermilk in which the corn was soaked made lower daily gains and consumed a larger amount of corn per 100 pounds gain than the pigs receiving tankage.

6. DIGESTER TANKAGE VERSUS MEAT SCRAPS

Recently a new protein supplement has become available for swine feeding. This is meat scraps, and is produced through a change in the method of processing meat and bone residue in packing houses. The change is from the old tank steam rendering method to a new dry rendering process. The latter method requires less expensive machinery and is more economical to operate for the packer; consequently, more meat scraps will likely be on the market as time goes on.

The names meat scraps, or meat and bone scraps, are used by most packers to distinguish the dry rendered product. The old process tankage is known as digester tankage. The former is lighter in color and has less odor than steam rendered tankage. For this reason it is especially desirable for poultry feeding, but enough is coming on the market that much is available for swine feeding.

The protein content varies in the tankages produced by the two methods. The meat scraps usually contain from 50 to 52 percent protein; the steam rendered tankage contains about 60 percent. They usually sell for about the same price, but frequently one may be purchased cheaper than the other.

Tests at other experiment stations have found that meat and bone scraps have a marked superiority over digester tankage as a protein supplement for pigs in spite of its low protein content. In order to secure additional information on this subject the Kansas Experiment Station conducted three tests.

First Test. — The first test was conducted in the winter of 1934-'35 with pigs self-fed corn in the dry lot. Four lots were fed. Lots 1 and 2 compared tankage and meat scraps when self-fed and when the pigs were given free access to alfalfa hay. Lots 3 and 4 compared tankage and meat scraps when they made up part of a Trinity Mixture. The feed offered each lot of pigs and the detailed data of this experiment are given in Table IX.

TABLE IX.—DIGESTER TANKAGE VERSUS MEAT SCRAPS FOR FATTENING PIGS SELF-FED CORN IN DRY LOT.

(December 11, 1934, to April 10, 1935—120 days)

RATION.	Corn (self-fed).			
	Tankage, alfalfa hay (self-fed).	Meat scraps, alfalfa hay (self-fed).	Tankage $\frac{1}{2}$, linseed meal $\frac{1}{4}$, alfalfa meal $\frac{1}{4}$ (self-fed).	Meat scraps $\frac{1}{2}$, linseed meal $\frac{1}{4}$, alfalfa meal $\frac{1}{4}$ (self-fed).
Lot No.	1	2	3	4
Number of pigs per lot.....	10	8	10	9
Av. initial weight per pig.....	<i>Pounds.</i> 52.37	<i>Pounds.</i> 54.75	<i>Pounds.</i> 52.30	<i>Pounds.</i> 51.74
Av. final weight per pig.....	221.83	215.33	228.10	221.30
Av. total gain per pig.....	169.46	160.58	175.80	169.56
Av. daily gain per pig.....	1.41	1.34	1.47	1.41
Av. daily ration per pig:				
Corn.....	4.95	4.66	4.87	4.67
Tankage.....	.35		.35	
Meat scraps.....		.46		.39
Linseed meal.....			.17	.20
Alfalfa meal.....			.17	.20
Alfalfa hay.....	.60	.81		
Feed required for 100 pounds gain:				
Corn.....	350.58	348.16	332.54	330.42
Tankage.....	25.08		23.86	
Meat scraps.....		34.20		27.68
Linseed meal.....			11.93	13.84
Alfalfa meal.....			11.93	13.84
Alfalfa hay.....	42.19	60.37		

Observations

Tankage compared with meat scraps, when fed singly or as part of a Trinity Mixture, as a protein supplement for fattening pigs in the dry lot, was a little more efficient, in the consumption of feed per 100 pounds gain and in producing a slightly greater average daily gain.

Second and Third Tests.—The second and third tests were conducted in the summers of 1934 and 1935, respectively, and were carried on with pigs self-fed corn on alfalfa pasture. Two lots of pigs were used in each test. One lot in each test received tankage self-fed, and the other lot received meat scraps. An average of the two tests is reported in Table X, which gives the detailed data.

TABLE X.—DIGESTER TANKAGE VERSUS MEAT SCRAPS FOR FATTENING PIGS SELF-FED CORN ON ALFALFA PASTURE.

(Average of two tests, summers of 1934-'35—116 days)

RATION.	Corn (self-fed), alfalfa pasture.	
	Tankage, 60% protein (self-fed).	Meat scraps, 50% protein (self-fed).
Lot No.	1	2
Number of pigs per lot.	9	10
Av. initial weight per pig.	<i>Pounds.</i> 55.48	<i>Pounds.</i> 55.28
Av. final weight per pig.	229.08	223.72
Av. total gain per pig.	173.60	168.44
Av. daily gain per pig.	1.50	1.46
Av. daily ration per pig:		
Corn.	4.33	4.22
Tankage. ....	.34	
Meat scraps. ....		.41
Feed required for 100 pounds gain:		
Corn.	288.68	290.07
Tankage.	22.67	
Meat scraps.		27.52

Observations

Meat scraps are almost as efficient as digester tankage in producing daily gains when fed to pigs on alfalfa pasture. The consumption of corn for 100 pounds gain was almost identical, and it required almost the same amount of meat scraps as tankage to produce 100 pounds gain.

Conclusions

These results are highly significant in view of the fact that many times meat scraps sell for less per ton than digester tankage. When this occurs, or when the two tankages sell at the same price, the tankage selling for the less money should be the one purchased by the swine feeder.

Recommendations

Probably the three best rations for fattening hogs in a dry lot under Kansas conditions are:

1. Grain plus tankage plus green colored alfalfa hay.
2. Grain plus tankage three parts and green colored alfalfa leaf meal one part.
3. Grain plus tankage three parts and green colored alfalfa meal one part.

II. CORN VERSUS WHEAT FOR FATTENING HOGS

Wheat is an important grain crop in Kansas. It is generally too high in price to feed to hogs. However, when corn becomes high in price, and wheat low, their possibilities as feed for hogs are brought more forcibly to the attention of swine feeders. Consequently, the relative value of corn and wheat as a hog feed is a matter of considerable importance throughout the state. The form in which to feed wheat is also an important matter. Two tests were conducted at this station for the purpose of securing information on the relative value of corn and wheat for swine feeding.

First Test.—In the first test, conducted in the summer of 1932, the pigs in all lots were self-fed tankage and grain on alfalfa pasture. Three lots of pigs were fed. One lot received shelled corn, another lot whole wheat, and a third lot was fed ground wheat. Detailed results are given in Table XI.

TABLE XI.—SHELLED CORN VERSUS WHEAT FOR FATTENING PIGS ON ALFALFA PASTURE.

(June 17 to September 9, 1932—84 days)

RATION.	Tankage (self-fed), alfalfa pasture.		
	Shelled corn.	Whole wheat.	Ground wheat.
Lot No.....	1	2	3
Number of pigs per lot.....	10	9	10
Av. initial weight per pig.....	<i>Pounds.</i> 83.73	<i>Pounds.</i> 81.85	<i>Pounds.</i> 83.77
Av. final weight per pig.....	208.20	203.33	208.30
Av. total gain per pig.....	124.47	121.48	124.53
Av. daily gain per pig.....	1.48	1.45	1.48
Av. daily ration per pig:			
Shelled corn.....	5.00		
Whole wheat.....		5.45	
Ground wheat.....			5.10
Tankage.....	.34	.24	.21
Feed required for 100 pounds gain:			
Shelled corn.....	337.19		
Whole wheat.....		376.58	
Ground wheat.....			343.85
Tankage.....	22.82	16.36	14.37

Observations

1. The difference in gains was small and scarcely significant.
2. The wheat appeared to be more palatable than the corn, for the average daily consumption of the lots receiving wheat was higher than that of the group receiving corn.
3. Less tankage was consumed daily by the lots fed whole or ground wheat.
4. It required less grain for 100 pounds gain in the lot fed corn than in the lots fed wheat. But the amount of tankage consumed for 100 pounds gain was less in the wheat fed lots than in the lot fed corn.

Second Test.—This test was conducted in the fall of the same year. Three lots of pigs were fed in this test in the dry lot. The rations were the same as in the first test. The pigs were self-fed their grain and a protein supplement. The results are found in Table XII.

TABLE XII.—SHELLED CORN VERSUS WHEAT FOR FATTENING PIGS IN DRY LOT.
 (September 24 to November 19, 1932—56 days)

RATION.	Tankage (self-fed).		
	Shelled corn.	Whole wheat.	Ground wheat.
Lot No.....	1	2	3
Number of pigs per lot.....	10	10	10
Av. initial weight per pig.....	<i>Pounds.</i> 83.57	<i>Pounds.</i> 83.00	<i>Pounds.</i> 83.43
Av. final weight per pig.....	173.40	168.10	181.40
Av. total gain per pig.....	89.83	85.10	97.97
Av. daily gain per pig.....	1.60	1.52	1.75
Av. daily ration per pig:			
Shelled corn.....	4.99		
Whole wheat.....		5.31	
Ground wheat.....			5.30
Tankage.....	.69	.49	.50
Feed required for 100 pounds gain:			
Shelled corn.....	310.92		
Whole wheat.....		349.35	
Ground wheat.....			303.15
Tankage.....	42.75	32.31	28.48

Observations

1. The pigs self-fed ground wheat and tankage made a daily gain of 1.75 pounds. The next best gaining lot was the shelled-corn-fed pigs. The whole-wheat-fed pigs gained the least satisfactorily.

2. The wheat appeared to be more palatable than the corn, for the average daily consumption of the lots receiving wheat was higher than that of the lot receiving corn. Less tankage was consumed daily by the wheat-fed groups.

3. It required less grain for 100 pounds gain in the lot fed ground wheat, 303.15 pounds, than in the corn-fed lot, which was only slightly higher, 310.92 pounds. The lot receiving whole wheat required somewhat more grain for 100 pounds gain than either of the other two. The amount was 349.35 pounds.

4. The amount of tankage consumed for 100 pounds gain was less in the wheat-fed lots than in the lot fed corn.

Conclusions

These experiments seem to indicate that hogs make bigger returns from wheat than from corn, and when the prices of the two grains are nearly equal, wheat may be economically substituted for corn. It should be remembered, however, that a protein supplement should be fed with wheat and that grinding will increase its efficiency as a feed.

III. THE DESIRABILITY OF RESTRICTING TANKAGE IN THE RATION OF FATTENING PIGS WHEN SELF-FED CORN

Previous tests at the Kansas Agricultural Experiment Station have shown the desirability of adding tankage to a corn ration for hogs on pasture in the summer or in dry lot in winter. Since the price of tankage is much higher than the price of corn, many believe that tankage is too expensive to feed, especially when hogs have access to alfalfa pasture or when corn is very cheap or when tankage is unusually high. As a result, feeders attempt to economize on the use of tankage; first, by restricting its use entirely, and second, by a limited use of it in different parts of the feeding period. The prevalence of this practice prompted three tests to bring to the attention of hog raisers the advantage of adding tankage to corn throughout the feeding period, whether the pigs are in pasture or dry lot.

First Test. —The first test of this study was designed to show the desirability of the use of tankage with corn when the pigs were self-fed on alfalfa pasture. Lot 1 received no tankage, lot 2 was self-fed tankage only the first 56 days, and lot 3 was self-fed tankage throughout the time they were on experiment. The detailed results follow in Table XIII.

TABLE XIII.—TANKAGE VERSUS NO TANKAGE FOR FATTENING PIGS SELF-FED CORN ON ALFALFA PASTURE.

(June 5 to September 25, 1934—112 days)

RATION.	Corn (self-fed), alfalfa pasture.		
		Tankage (self-fed first 56 days).	Tankage (self-fed throughout entire period).
Lot No.	1	2	3
Number of pigs per lot.	9	9	8
Av. initial weight per pig.	<i>Pounds,</i> 51.11	<i>Pounds,</i> 52.63	<i>Pounds,</i> 52.63
Av. final weight per pig.	133.63	187.63	221.67
Av. total gain per pig.	82.52	135.00	169.04
Av. daily gain per pig. ....	.74	1.21	1.51
Av. daily ration per pig:			
Corn.	2.86	3.99	4.41
Tankage. ....		.37*	.41
Feed required for 100 pounds gain:			
Corn.	388.54	331.10	291.93
Tankage.		15.22†	27.06

* Figured on 56-day basis.
 † Figured on 112-day basis.

Observations

1. The daily gain of the pigs receiving tankage throughout the feeding period in addition to corn and alfalfa pasture was nearly 50 percent greater than the daily gain in the lot receiving no tankage in addition to corn and alfalfa pasture. The cost of gains was 8 percent less with the pigs in the lot fed tankage in addition to the pasture and corn.
2. The pigs in the lot receiving tankage in addition to corn and alfalfa pasture were finished and ready for market, but the pigs in the lot receiving no tankage were not finished.
3. Each pound of tankage fed replaced 3.6 pounds of corn in producing 100 pounds of gain.
4. In lot 2 where tankage was fed only the first 56 days, the daily gains of the pigs were more than those that received no tankage in lot 1, and less than those in lot 3 that received tankage throughout the entire experiment. The feed required for 100 pounds gain was less than when compared with the pigs in lot 1 that received no tankage and more when compared with those in lot 3 that received tankage throughout the experiment.

Second Test.—This test, conducted during the summer of 1933, shows the undesirability of removing the protein supplement from the ration of pigs self-fed corn in the dry lot after they are 150 pounds in weight. The pigs in lot 1 were self-fed tankage and alfalfa hay throughout the experiment, those in lot 2 were self-fed tankage and alfalfa hay the first 56 days, at which time they were approximately 150 pounds in weight. The last 44 days of the test the lot-2 pigs received no protein supplement—neither tankage nor alfalfa hay. The detailed data in this experiment are reported in two periods, and also with the two periods combined, in Table XIV.

TABLE XIV.—REMOVING THE PROTEIN SUPPLEMENT FROM THE RATION OF PIGS SELF-FED CORN IN THE DRY LOT AFTER THEY ARE 150 POUNDS IN WEIGHT.
 (June 27 to October 5, 1933—100 days)

RATION.	First period 56 days.		Second period 44 days.		Periods 1 and 2 com- bined 100 days.	
	Corn (self-fed).					
	Tankage, alfalfa hay (self-fed).	Tankage, alfalfa hay (self-fed).	Tankage, alfalfa hay (self-fed).		Tankage, alfalfa hay (self-fed).	Tankage, alfalfa hay (self-fed first 56 days).
Lot No.....	1	2	1	2	1	2
Number of pigs per lot...	10	9	10	9	10	9
Av. initial weight per pig,	<i>Pounds.</i> 85.10	<i>Pounds.</i> 82.30	<i>Pounds.</i> 154.70	<i>Pounds.</i> 146.77	<i>Pounds.</i> 85.10	<i>Pounds.</i> 82.30
Av. final weight per pig..	154.70	146.77	228.70	188.45	228.70	188.45
Av. total gain per pig....	69.60	64.47	74.00	41.53	143.60	106.15
Av. daily gain per pig....	1.24	1.15	1.68	.94	1.43	1.06
Av. daily ration per pig:						
Corn.....	4.01	3.43	6.91	5.72	5.19	4.57
Tankage.....	.44	.36	.48	.....	.46	.22
Alfalfa hay.....	.12	.12	.15	.....	.14	.06
Feed required for 100 pounds gain:						
Corn.....	323.13	298.27	397.56	606.50	361.49	430.21
Tankage.....	35.91	31.59	28.51	.....	32.10	20.83
Alfalfa hay.....	1.02	1.05	9.32	.....	9.74	5.96

Observations

This test shows that when the protein supplement is removed from the ration of fattening pigs after they have reached 150 pounds in weight the daily gain and the feed consumed by each pig daily are materially decreased while the amount of feed required for 100 pounds gain is materially increased.

Third Test.—This test, conducted during the winter of 1933-'34, shows the undesirability of removing the protein supplement, tankage and alfalfa hay, from the ration of pigs self-fed corn in the dry

lot after they have reached 200 pounds in weight. These pigs were fed identically as those in the second test except that those in lot 2 of this test were allowed protein supplements until they had reached 200 pounds in weight before these supplements were removed. The detailed data are reported similarly as in the second test. See Table XV.

TABLE XV.—REMOVING THE PROTEIN SUPPLEMENT FROM THE RATION OF PIGS SELF-FED CORN IN THE DRY LOT AFTER THEY HAVE REACHED 200 POUNDS IN WEIGHT.

(December 18, 1933, to April 20, 1934—128 days)

RATION.	Corn (self-fed).					
	First period 100 days.		Second period 28 days.		Periods 1 and 2 com- bined 128 days.	
	Tankage, alfalfa hay (self-fed).	Tankage, alfalfa hay (self-fed).	Tankage, alfalfa hay (self-fed).		Tankage, alfalfa hay (self-fed).	Tankage, alfalfa hay (self-fed first 100 days).
Lot No.	1	2	1	2	1	
Number of pigs per lot...	10	10	10	10	10	10
Av. initial weight per pig.	<i>Pounds.</i> 48.53	<i>Pounds.</i> 48.47	<i>Pounds.</i> 195.00	<i>Pounds.</i> 191.30	<i>Pounds.</i> 48.53	<i>Pounds.</i> 48.47
Av. final weight per pig..	195.00	191.30	246.97	229.47	246.97	229.47
Av. total gain per pig....	146.47	142.83	51.97	38.17	198.44	181.00
Av. daily gain per pig....	1.46	1.43	1.86	1.36	1.55	1.41
Av. daily ration per pig:						
Corn	4.75	4.73	7.64	6.74	5.39	5.17
Tankage .....	.60	.58	.24	.....	.52	.42
Alfalfa hay .....	.68	.74	.33	.....	.60	.58
Feed required for 100 pounds gain:						
Corn	324.54	331.02	411.78	494.63	347.38	365.53
Tankage	40.90	37.42	12.89	.....	33.56	29.53
Alfalfa hay	46.47	51.91	17.51	.....	38.89	40.97

Observations

This test shows that when the protein supplement is removed from the ration of fattening pigs after they have reached approximately 200 pounds in weight, the daily gain and the feed consumed by each pig daily are materially decreased while the amount of feed required for 100 pounds gain is materially increased.

Conclusions

These tests emphasize the fact that tankage fed throughout the fattening period to pigs on alfalfa pasture or alfalfa hay in the dry lot produces more rapid gains and a higher degree of finish than corn fed to pigs on alfalfa pasture or to pigs fed corn alone in the dry lot.

IV. ALFALFA PASTURE FEEDING VERSUS DRY LOT FEEDING FOR FATTENING SPRING PIGS

Pasture crops play an important part in the production of pork. Previous experiments at this station have shown that perhaps the most important function of pasture is the reduction in the amount of concentrated feed required to produce a given gain. Pasturing also eliminates the labor of harvesting the crop and reduces the labor generally necessary in caring for pigs. In order to secure additional information regarding the value of alfalfa pasture feeding versus dry-lot feeding for fattening spring pigs for market, three tests were conducted in the summers of 1931, 1933, and 1935.

In each of the three tests two lots of ten pigs each were used. One lot was self-fed corn and tankage on alfalfa pasture; another lot was self-fed corn, tankage, and good quality alfalfa hay, but were confined to a dry lot.

The results of the three tests have been averaged together and are here presented in detail in Table XVI.

TABLE XVI.—ALFALFA PASTURE FEEDING VERSUS DRY LOT FEEDING FOR FATTENING SPRING PIGS.

(Average of three tests, 1931, 1933, 1935—120 days each)

RATION.	Corn (self-fed), tankage (self-fed).	
	Alfalfa pasture.	Alfalfa hay (self-fed) (dry lot).
Lot No.	1	2
Number of pigs per lot.	10	10
Av. initial weight per pig.	<i>Pounds.</i> 68.60	<i>Pounds.</i> 68.93
Av. final weight per pig.	244.44	232.48
Av. total gain per pig.	175.94	163.55
Av. daily gain per pig.	1.55	1.44
Av. daily ration per pig:		
Corn.	4.80	5.18
Tankage. ....	.24	.48
Alfalfa hay. ....		.24
Feed required for 100 pounds gain:		
Corn.	308.30	358.64
Tankage.	15.57	33.11
Alfalfa hay.		16.42

Observations

1. The daily gains of the pigs self-fed corn and tankage on alfalfa pasture were nearly 9 percent greater than the daily gains of the pigs self-fed corn, tankage, and alfalfa hay in the dry lot.
2. The dry-lot-fed pigs consumed more than twice as much tankage for 100 pounds gain than did the pasture-fed pigs.
3. The dry-lot-fed pigs consumed 16 percent more corn per 100 pounds gain than those being fed on pasture.

Conclusions

These experiments indicate that pasture feeding excels dry-lot feeding by producing faster and more economical gains, and that pasture feeding should be more generally appreciated as an economical method of producing pork.

V. PREPARATION OF THE GRAIN FEED FOR FATTENING PIGS

Previous tests at the Kansas Agricultural Experiment Station have shown that an efficient and economical utilization of feed accompanies the practice of self-feeding shelled corn, tankage, and alfalfa hay to fattening hogs in the dry lot, or self-feeding shelled corn and tankage on alfalfa pasture. In fact, this station has recommended this practice for many years over the practice of preparing the corn by grinding, soaking, or mixing it with the protein supplement. There are many, however, who believe that grinding the corn and mixing it with the protein supplement, or soaking shelled corn for fattening pigs will materially enhance the feeding value of the grain and fatten the pigs more rapidly and economically. The prevalence of this opinion prompted two tests to be conducted to show the relative efficiency of feeding the corn shelled compared with grinding and mixing it with tankage or of soaking it.

First Test. — The first test was conducted in the winter of 1933-'34 with pigs in the dry lot. In lot 1 shelled corn and tankage were self-fed. In lot 2 alfalfa hay was self-fed, and corn and tankage were self-fed in a mixture according to the weight of the pigs, viz: pigs under 120 pounds received a mixture of 90 parts ground corn to 10 parts tankage. When they had reached a weight of 120 to 170 pounds the mixture was changed to 93 parts ground corn and 7 parts tankage. When they had reached the weight of 170 pounds they received a mixture of 95 parts ground corn and 5 parts tankage until they were finished (about 250 pounds) for market. The pigs in both lots had free access to alfalfa hay. The results are given in detail in Table XVII.

TABLE XVII.—SELF-FEEDING MIXED RATIONS VERSUS FREE CHOICE FEEDING FOR FATTENING PIGS IN DRY LOT.

(December 18, 1933, to April 20, 1934—128 days)

RATION.	Alfalfa hay (self-fed).	
	Shelled corn (self-fed) and tankage (self-fed).	Ground corn and tankage mixed and self-fed.
Lot No.	1	2
Number of pigs per lot.	10	10
Av. initial weight per pig.	<i>Pounds.</i> 48.53	<i>Pounds.</i> 48.00
Av. final weight per pig.	246.97	245.73
Av. total gain per pig.	198.44	197.73
Av. daily gain per pig.	1.55	1.54
Av. daily ration per pig:		
Shelled corn.	5.39	.....
Ground corn. ....	.....	5.36
Tankage. ....	.52	.41
Alfalfa hay. ....	.80	.87
Feed consumed for 100 pounds gain:		
Shelled corn.	347.38	.....
Ground corn. ....	.....	346.68
Tankage.	33.56	26.40
Alfalfa hay.	38.89	43.49

Observations

This test shows that self-feeding mixtures of ground corn and tankage in varying proportions for fattening pigs, according to their weight, is no improvement over the method of self-feeding shelled corn, tankage, and alfalfa hay free choice throughout the feeding period. Daily gains and feed consumed for 100 pounds gain are practically identical. The cost of the grains in mixing the rations, however, is increased because a cost for grinding the corn and mixing the feed must be charged against the method.

Second Test. — This test was conducted during the summer of 1935, and was designed to answer the question as to the desirability of soaking shelled corn for fattening pigs. Lot 1 was self-fed shelled corn and tankage on alfalfa pasture. Lot 2 received shelled corn after it was soaked 24 hours in water and fed twice per day according to appetite. The tankage was self-fed. The detailed results are given in Table XVIII.

TABLE XVIII.—DRY CORN VERSUS SOAKED CORN FOR FATTENING PIGS ON ALFALFA PASTURE.

(June 1 to September 29, 1935—120 days)

RATION.	Tankage (self-fed), alfalfa pasture.	
	Dry corn.	Soaked corn.
Lot No.....	1	2
Number of pigs per lot.....	9	10
Av. initial weight per pig.....	<i>Pounds.</i> 58.33	<i>Pounds.</i> 58.90
Av. final weight per pig.....	236.48	250.83
Av. total gain per pig.....	178.15	191.93
Av. daily gain per pig.....	1.48	1.60
Av. daily ration per pig:		
Corn.....	4.24	5.35
Tankage.....	.27	.27
Feed required for 100 pounds gain:		
Corn.....	285.43	334.76
Tankage.....	18.28	17.14

Observations

The pigs fed soaked corn with tankage self-fed made the largest daily gains but required 17 percent more corn to produce 100 pounds of gain which made the cost of the gains larger for the soaked-corn-fed pigs. The amount of tankage consumed was about the same in both lots.

Soaking the corn required additional labor and would add somewhat to the cost for 100 pounds of gain.

VI. SOILING ALFALFA FOR FATTENING PIGS

It has been recognized for a long time that the usual practice of feeding fattening hogs on pasture is somewhat wasteful, because the hogs leave so many ungrazed areas in the field that are trampled down. This trampled forage will not make good hay, and as a result the practice usually results in about as much wasted forage as is actually consumed by the pigs.

Even though grazing is wasteful, pasturing crops is profitable, for it is a well-known fact that pasture supplied with a ration of corn and tankage is profitable in producing pork. Swine make greater and faster gains when pasture is supplied than they do in a dry lot on corn and tankage and alfalfa hay. The reason for this lies in the fact that pasture supplies other factors in the ration, not supplied by corn and tankage, that are necessary for a maximum response to feed. One of these factors is the vitamin A supplied so abundantly in green succulent forage.

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In order to conserve the alfalfa and yet supply the hogs with the green succulence so necessary, the Kansas Agricultural Experiment Station decided to hand-feed fresh-cut green alfalfa to pigs in the dry lot. Accordingly three tests were conducted to study the matter.

First and Second Test.—One of these tests was conducted in the summer of 1933 and the other in the summer of 1934. Three lots of pigs were used in each test. All lots were self-fed corn and tankage. Lot 1 was fed on alfalfa pasture; lot 2 had free access to alfalfa hay and was fed in the dry lot; lot 3 was fed in the dry lot but received fresh-cut green alfalfa in a rack under shelter two times per week. The averaged detailed results of these two experiments are reported in Table XIX.

TABLE XIX.—ALFALFA PASTURE VERSUS ALFALFA HAY VERSUS FRESH-CUT GREEN ALFALFA FOR FATTENING PIGS SELF-FED CORN AND TANKAGE.

(Average two tests, 1933-'34—106 days)

RATION.	Corn (self-fed), tankage (self-fed).		
	Alfalfa pasture.	Alfalfa hay (dry lot).	Fresh-cut green alfalfa (twice a week in dry lot).
Lot No.	1	2	3
Number of pigs per lot.	10	10	10
Av. initial weight per pig.	<i>Pounds.</i> 68.91	<i>Pounds.</i> 68.19	<i>Pounds.</i> 67.48
Av. final weight per pig.	231.07	219.50	210.78
Av. total gain per pig.	162.15	151.32	143.30
Av. daily gain per pig.	1.53	1.43	1.35
Av. daily ration per pig:			
Corn.	4.68	4.61	4.28
Tankage. ....	.32	.46	.47
Alfalfa hay. ....		.21	
Fresh-cut green alfalfa.			1.33
Feed required for 100 pounds gain:			
Corn.	305.32	322.17	316.81
Tankage.	21.13	32.17	34.78
Alfalfa hay.		14.62	
Fresh-cut green alfalfa.			44.67

Observations

1. The most rapid daily gains were made by the pigs receiving the alfalfa pasture. The second highest gaining pigs were in the lot that received alfalfa hay in dry lot; while the pigs receiving fresh-cut green alfalfa twice a week made the slowest gains.

2. Although the pigs in the lot fed on alfalfa pasture utilized the least corn and tankage for each 100 pounds of gain, the pigs in the fresh-cut green alfalfa fed lot were more economical in their feed requirements for a unit of gain than those that received alfalfa hay.

Third Test.—With the rather encouraging showing made by the pigs in the first and second tests that received fresh-cut green alfalfa two times per week, it was thought that possibly the pigs would do better if the fresh-cut green alfalfa was supplied three times per week instead of two. Consequently, a test was conducted in the summer of 1935. Three lots of pigs were fed exactly as in the first test except that lot 3 received the fresh-cut alfalfa three times per week. The detailed results of this test are given in Table XX.

TABLE XX.—ALFALFA PASTURE VERSUS ALFALFA HAY VERSUS FRESH-CUT GREEN ALFALFA FOR FATTENING PIGS SELF-FED CORN AND TANKAGE.

(June 1 to September 29, 1935—120 days)

RATION.	Corn (self-fed), tankage (self-fed).		
	Alfalfa pasture.	Alfalfa hay (dry lot).	Fresh-cut green alfalfa (three times per week in dry lot).
Lot No.....	1	2	3
Number of pigs per lot.....	9	9	10
Av. initial weight per pig.....	<i>Pounds.</i> 58.33	<i>Pounds.</i> 58.89	<i>Pounds.</i> 58.13
Av. final weight per pig.....	236.48	224.52	217.50
Av. total gain per pig.....	178.15	165.63	159.37
Av. daily gain per pig.....	1.48	1.38	1.33
Av. daily ration per pig:			
Corn.....	4.24	4.83	4.07
Tankage.....	.27	.51	.51
Fresh-cut green alfalfa.....			1.10
Alfalfa hay.....		.35	
Feed required for 100 pounds gain:			
Corn.....	285.43	349.77	351.32
Tankage.....	18.28	36.76	38.12
Fresh-cut green alfalfa.....			82.45
Alfalfa hay.....		25.10	

Observations

1. In this test the pigs fed fresh-cut green alfalfa three times per week made the smallest daily gains but showed an economical consumption of corn and tankage for each 100 pounds gain.

2. The daily gains and consumption of feed for 100 pounds gain by the pigs fed fresh-cut green alfalfa was little less than it was for the pigs that received alfalfa hay.

Conclusions

It would seem from these tests that fresh-cut green alfalfa fed to hogs in a dry lot two or three times a week when self-fed corn and tankage would be a better practice than feeding pigs in the dry lot without alfalfa hay.