

**Table 62**  
Free-Choice Feeding Compared with Completely Mixed Rations in Pellets.

December 6, 1955, to March 12, 1956—97 days.

Ration fed .....	Shelled corn, Protein-mixed supplement, free choice	Pellets (complete mixture corn and protein supplements)
Lot number .....	1	2
Number pigs in lot .....	9	9
Av. initial wt. per pig, lbs. ....	50.70	51.90
Av. final wt. per pig, lbs. ....	221.11	203.33
Av. total gain per pig, lbs. ....	169.11	151.43
Av. daily gain per pig, lbs. ....	1.74	1.56
Av. daily ration per pig, lbs.:		
Shelled corn .....	5.16	
Protein supplement .....	.82	
Pellets .....		5.47
Lbs. feed per 100 lbs. gain per pig:		
Shelled corn .....	329.04	
Protein supplement .....	52.36	
Pellets .....		350.87

**Observations**

1. The daily feed consumption of the pigs fed free choice was .51 pound greater than that of those fed pellets.
2. The pigs fed free choice gained .18 pound more each day than the pellet-fed pigs.
3. The pellet-fed pigs required 30.5 pounds less total feed than the pigs fed free choice.
4. In this experiment complete mixtures of corn and protein supplements slowed the daily rate of gain but reduced the feed consumed per 100 pounds gain. If the costs of grinding, mixing, and pelleting were considered, their expense probably would offset the cost of the 30.5 pounds of feed saved.

**Comparative Value of Corn and Whole and Ground Milo as Swine-Fattening Feeds.**

PROJECT 110, Test 7

C. E. Aubel

In many parts of Kansas sorghum grains are grown extensively. In previous feeding tests with hogs at this station, some sorghum grains gave excellent results compared with corn. In 1950 Westland milo and Midland milo gave 12 percent greater daily gains than did corn. The economy in feed per 100 pounds gain was about 5 percent better from sorghum grain than from corn. Because corn has been more difficult to produce in Kansas while sorghum grains have increased in popularity, it was thought advisable to get results from a 1956 experiment that compared corn with sorghum grain, with the sorghum grain prepared for feeding in different ways.

Five lots of pigs were self-fed in dry lot. All lots received a mixed animal and plant protein supplement of 4 parts tankage, 4 parts soybean meal, 1 part linseed meal, and 1 part alfalfa meal. The milo was an unidentified variety, straight elevator run. Lot 1 received shelled corn; Lot 2, whole milo; Lot 3, dry rolled milo; Lot 4, wet rolled milo; and Lot 5, rolled milo with 5 percent cane molasses added.

Table 63 gives the results.

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**Table 63**  
Comparative Value of Corn and Milo as Swine-Fattening Feeds.  
December 6, 1955, to March 12, 1956—97 days.

Ration fed .....	Shelled corn, Protein mixed supplt.	Whole milo, Protein mixed supplt.	Dry-rolled milo, Protein mixed supplt.	Wet-rolled milo, Protein mixed supplt.	Rolled milo, 5 percent molasses-mixed protein supplt.
Lot number .....	1	2	3	4	5
Number pigs in lot .....	9	9	9	10	9
Av. initial wt. per pig, lbs. ....	50.70	52.77	52.40	51.50	50.30
Av. final wt. per pig, lbs. ..	221.11	216.66	214.77	198.50	219.44
Av. total gain per pig, lbs. ....	169.11	163.89	162.37	147.00	169.14
Av. daily gain per pig, lbs. ....	1.74	1.68	1.67	1.51	1.74
Av. daily ration per pig, lbs.:					
Grain .....	5.16	6.28	6.68	5.96	6.47
Protein mix .....	.82	.79	.88	.91	.86
Lbs. feed per 100 lbs. gain per pig:					
Grain .....	329.04	372.06	399.36	354.08	371.15
Protein mix .....	52.36	46.98	52.62	54.14	49.40

**Observations**

1. The daily gains of the pigs receiving corn were slightly greater than for the pigs receiving whole or dry-rolled milo. With the wet-rolled milo daily gains of pigs were .23 pound less. The pigs getting rolled milo with molasses made the same daily gains as the corn-fed pigs.
2. Thus the whole- or dry-rolled milo on a pound-for-pound basis was about 3 percent less efficient than corn. The wet-rolled milo was about 13 percent less efficient.
2. The quantity of grain consumed per 100 pounds gain was greater in all the milo-fed lots than in the corn-fed lots, running from a little less than 1 percent with wet-rolled milo to 21 percent with the dry-rolled milo; however, cost of corn usually is at least 20 percent more than milo per pound.
3. The protein supplement requirements per 100 pounds gain varied from a little less in Lots 2 and 5 to a little more in Lots 3 and 4 than required by pigs fed corn. The protein requirements for all varied only slightly.
4. The milo was palatable. Each lot fed milo consumed more grain daily than the lot fed corn.
5. Milo was a satisfactory, though not outstanding, grain for feeding in this experiment.

**Metabolism of Carotenoid Pigments and Vitamin A by Swine.**

PROJECT 311, Test 8

Relative Value of Carotenoid Pigments of New-Crop (1954) Yellow Corn and Old-Crop (1948-49 government stored) Yellow Corn and of Dehydrated Alfalfa for Supplying the Vitamin A Requirements of Weaning Pigs.

D. B. Parrish and C. E. Aubel

Question has been raised concerning the vitamin A potency of stored yellow corn. Samples of 1954 corn and 1948-49 stored corn were analyzed for provitamin A content by a separation and chemical determination of the carotene and crude cryptoxanthin contents. The 1948-

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49 sample was found to have a vitamin A activity of about 800 units per pound, slightly less than one-third of that of 1954 corn. In this work 1 mg. of carotene was given a vitamin A value of 1.6 units and cryptoxanthin one-half that value, which are the vitamin A activities previously determined by bioassay with rats. Although much vitamin A activity apparently had been lost during storage of yellow corn, there was still the problem of the availability of the remaining vitamin A for animals. This was studied, using weanling pigs as the experimental animal.

Twenty-seven weanling pigs of both sexes were distributed on the basis of weight and sex into nine lots. These pigs were from gilts fed a vitamin A restricted diet during the gestation and nursing periods.

Pigs in three lots were given ration 1, containing old-crop yellow corn as the sole source of vitamin A. Three lots were given ration 2, containing only sufficient new-crop yellow corn to supply the same vitamin A activity as ration 1. The rest of the corn of this ration was white. Three lots were given ration 3 containing white corn plus sufficient high-quality dehydrated alfalfa so that the ration had the same vitamin A activity as ration 1. Rations are shown in Table 64.

These rations contained about 610 units of vitamin A activity per pound, based on chemical analysis. Based on available information, the pigs should have obtained sufficient vitamin A from this ration for growth when fed according to accepted feeding standards, provided the analytically determined vitamin A was available to the pigs. There would not, however, be much excess vitamin A activity, so any marked differences found in utilization should affect growth and vitamin A storage.

For the first week after weaning the pigs were fed rations containing all white corn and no supplemental source of vitamin A. The three experimental rations were fed for nine weeks. Pigs in each lot were group fed. The pigs did not eat the experimental feeds readily for a few days, and for a short time feed intake, as well as vitamin A intake, was less than expected.

Blood serum was analyzed for vitamin A content at the end of the experiment. Average body weights and vitamin A content of serums are shown in Table 65.

#### Observations

By analytical chemical determinations a sample of old-crop yellow corn (1948-49) had a vitamin A potency of about 800 units per pound and a sample of new-crop yellow corn (1954) had a vitamin A potency of 2700 units per pound. Carotene and cryptoxanthin, two yellow pigments, supply the vitamin A activity of corn.

Gains of pigs fed the old-crop yellow corn ration were a little less than those of the pigs fed new-crop yellow corn or alfalfa, but vitamin A content of blood serums was a little more in pigs fed the old corn. In view of the small differences observed and small variations within ration groups, it appears that results were essentially the same, regardless of the source of vitamin A in the ration. The provitamin A of old-crop yellow corn, as determined by analytical chemical methods, appeared to be as available to weanling pigs in this experiment as provitamin A from new-crop yellow corn or alfalfa meal.

Table 64  
Composition of Rations Fed Weanling Pigs.<sup>1</sup>

Ration .....	1 2 3		
	%		
Yellow corn .....	76 <sup>2</sup>	22.3 <sup>3</sup>	
White corn .....		53.7	73.5
Soybean oil meal .....	17	17	17
Non-fat dry milk .....	2.5	2.5	2.5
Brewer's yeast .....	1.5	1.5	1.5
Limestone			
Bonemeal			
Salt			
Vitamin premix <sup>4</sup> .....	1	1	1
Trace mineral premix <sup>4</sup> .....	1	1	1
Dehydrated alfalfa .....			2.5 <sup>5</sup>

1. Ration mixed three times. Composition adjusted slightly each time based on vitamin A potency values obtained on corn and alfalfa just previous to ration mixing.

2. Old-crop stored corn (1948-49).

3. New-crop corn (1954).

4. Premix carriers were shorts.

5. 1128 grams.

Table 65

Average Body Weights and Vitamin A Content of Blood Serum of Pigs.

Rations .....	Lot <sup>1</sup>	Average wt.		Average gain		Vitamin A, mg./100	
		5/9/55	7/2/55	By lot	By ration	ml serum <sup>2</sup>	By lot
Old-crop corn .....	1	19.8	51.0	31.2			7.0
	2	19.7	51.5	31.8			7.6
	3	19.2	53.4	34.2			6.4
New-crop corn ....	4	20.0	53.4	33.4	32.4		7.0
	5	19.7	53.4	33.7			8.1
	6	19.3	54.7	35.4			5.4
Alfalfa meal .....	7	20.0	52.7	32.7	34.2		6.0
	8	19.0	53.5	34.5			5.8
	9	19.8	55.3	35.5			6.7
					34.2		3.8
							5.4

1. Three pigs per lot.

2. At termination of experiment.

