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Rations for Weanling Pigs

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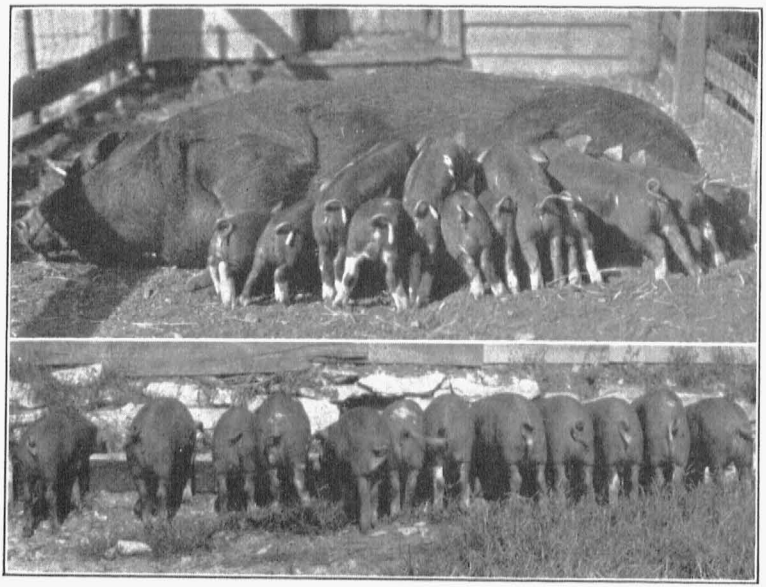

Weanling time is a critical period in the life of the pig. Changing from a ration consisting largely of mother's milk to one which does not contain this valuable feed requires a careful selection of feeding stuffs in order to satisfactorily supply the nutritive requirements of the young growing animal.

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SUMMARY

1. Weanling pigs fed corn and tankage in dry lot failed to make satisfactory gains and a relatively large amount of feed was required to produce 100 pounds gain compared with the results secured when corn and tankage was fed to similar pigs on pasture.

2. Pigs having an initial weight of approximately 30 pounds made more rapid gains and required less feed per unit gain when fed corn supplemented with a mixture of liver meal, dairy by-products, alfalfa meal and minerals in dry lot than similar pigs fed corn and tankage on pasture indicating that a ration of corn, tankage and pasture does not adequately meet the requirements of weanling pigs although pigs fed corn and tankage on pasture did better than those fed rations of either corn and skimmilk or corn supplemented with a mixture of tankage, oil by-products and alfalfa meal in dry lot.

3. Weanling pigs fed a ration of corn supplemented with a mixture of equal parts tankage, linseed oil meal, fish meal, liver meal, dried skimmilk and alfalfa meal made more rapid gains than pigs fed corn supplemented with a mixture of 3 parts tankage, 1 part linseed oil meal and 1 part alfalfa meal (minerals self fed in each case) but the advantage which the former mixture had was confined largely to the first 28-day period immediately following weaning.

4. The addition of either dried skimmilk, fish meal or liver meal to a ration of yellow corn supplemented with the standard protein mixture of tankage, linseed oil meal and alfalfa meal plus minerals, self fed, improved the ration for feeding pigs from weaning time until they reached a weight of 100 pounds and the addition of two or more of these feeds produced slightly better results than when a single one was added.

5. In these experiments liver meal gave slightly better results than dried skim milk and this dairy by-product was superior to fish meal.

ABSTRACT

This bulletin reports the results of investigations made during an 8-year period to find, if possible, a protein supplement which would give even better results for feeding with corn to weanling pigs than the recognized standard supplement of tankage when fed on good pasture or a mixture of tankage, linseed oil meal, and alfalfa meal when fed in dry lot.

Experiments reported indicate that corn, tankage and pasture or corn and a mixture of tankage, linseed oil meal, and alfalfa meal plus minerals, self fed in each case, do not adequately meet the requirements of pigs from weaning time until a weight of 100 pounds has been reached. Small amounts of either dried skimmilk, fish meal, liver meal (or combinations of these) added to the standard rations improved the ration for short feeding periods immediately following weaning.

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The Missouri Agricultural Experiment Station has compared a large number of protein supplements for feeding with corn to fattening hogs both in dry lot and on pasture. These studies have included tankage; the wheat by-products, shorts and bran; milk by-products, i. e. skimmilk, semi-solid and dried buttermilk; linseed oil meal; soybean oil meal; ground soybeans; ground oats (hulls out); garbage tankage, and gluten meal; as well as a number of commercially mixed hog feeds and so called pig meals. In these experiments the protein supplements were fed both singly and in combination. The pigs for the most part were started on feed at weaning time or soon thereafter and fed until they reached marketable weight as fat hogs.

In general, the results of these tests* have shown corn and a 60% protein tankage to be the most practical ration for feeding fattening hogs on pasture when both rate and economy of gains were considered. Contrasted with these results is evidence that a combination of corn and tankage does not adequately meet the requirements of young pigs fed in dry lot.

Corn and Tankage Inadequate as Ration for Young Pigs in Dry Lot

Table 1 reports Missouri Experiment Station data on two comparable lots of weanling pigs one of which was fed corn and tankage on pasture and the other fed corn and tankage in dry lot.

TABLE 1.—CORN AND TANKAGE IN DRY LOT AND ON PASTURE

Lot (10 Pigs)	A	B
Rations (Hand Fed)	Dry Lot Mixed Corn 12 Tankage 1	Rape & Oat Pasture Mixed Corn 12 Tankage 1
Average Initial Weight (lbs.)	36.90	36.06
Average Final Weight (lbs.)	80.5	174.00
Average Daily Gain per Head (lbs.)	.39	1.23
Average Daily Feed per Head (lbs.)	1.95	4.2
Feed per 100 lbs. Gain (lbs.)—		
Corn	461.97	314.87
Tankage	38.49	26.24
Total	500.46	341.11

Data reported in Table 1 show that weanling pigs fed corn and tankage in dry lot failed to make satisfactory gains and that a relatively large amount of feed was required for 100 lbs. gain compared with the results secured when corn and tankage were fed to similar

*Missouri Bulletins Nos. 144, 247, 266

pigs on pasture. These results are typical of other experiments indicating the failure of a corn and tankage ration to satisfactorily meet the feed requirements of young pigs.

Weanling Pigs Fed Special Rations in Dry Lot Made as Rapid Gains as Those Fed on Pasture

There was some question as to whether any dry lot ration would give as good results as a ration containing green forage. Smith in his Pork Production* summarizes the results of eleven experiments at three stations where the dry lot method of feeding pigs was compared with feeding on pasture and reports that with balanced rations and full feeding, pasture increased the average rate of gain by 37%. In these experiments the hogs fed in dry lot also required approximately 15% more concentrate to produce 100 lbs. gain than when fed on pasture.

In an effort to determine if maximum gains could be secured with weanling pigs fed in dry lot a ration consisting of shelled yellow corn (self fed) plus a supplementary mixture (self fed) made up of ground yellow corn 67.5%, liver meal 15%, dried buttermilk 10%, alfalfa meal 5%, mineral (equal parts ground limestone, bone meal and common salt), 2.5%; and skimmilk (or buttermilk) fed in such amounts as the hogs would clean up three times per day was fed to some pigs just weaned. This particular ration was selected since previous tests† at this station indicated that it would furnish (at least in large measure) the requirements necessary for producing maximum growth in young animals.

The above ration was compared with a number of other good rations including corn supplemented with a protein mixture containing approximately 49% protein composed of tankage 60%, linseed oil meal 15%, cottonseed meal 15%, alfalfa meal 10%; and corn supplemented with creamery skimmilk (a part of the time skimmilk was not available so that creamery buttermilk was fed instead); as well as with a ration of corn and tankage fed on rape and oat pasture. The hogs in dry lot (Lots I, II, and III) were fed 105 days while those fed on pasture (Lot IV) were on the experiment 112 days. A mineral mixture composed of equal parts ground limestone, bone meal and salt was self fed to all lots except Lot I in which case the mineral was a part of the mixed supplementary concentrate. Shelled yellow corn was fed to all lots. Lots I, II, and III were self fed corn and supplement free choice while Lot IV was fullfed by hand twice daily. Table 2 reports the summarized data.

Data reported in Table 2 show that the hogs in Lot I fed in dry lot made the fastest gain, 1.33 pounds per head daily, as compared

*Pork Production—Macmillan
†Missouri Research Bulletin No. 81

TABLE 2.—RATIONS FOR WEANLING PIGS IN DRY LOT AND ON PASTURE.

Lot (10 Pigs)	I	II	III	IV
Rations	Dry Lot Corn Mixed concentrate* Milk	Dry Lot Corn Milk	Dry Lot Corn (Tank. 60) (L.O.M.15) (C.S.M.15) (Alf.M.10)	Rape & Oat Pasture (Corn 12) (Tank. 1)
Average Initial Weight (lbs.)	31.7	32.2	31.9	36.06
Average Final Weight (lbs.)	177.14	146.07	131.18	174.00
Average Daily Gain per Head (lbs.)	1.33	1.09	.87	1.23
Average Daily Feed per Head (lbs.)	3.68 6.44†	2.62 6.12†	3.08	4.2
Feed per 100 lbs. Gain (lbs.)—				
Corn	276.08‡	239.16	270.51	314.87
Supplement	483.20†	559.60†	83.03	26.24
Total	------	------	353.54	341.11

*Corn 67.5%, liver meal 15%, dried buttermilk 10%, alfalfa meal 5%, mineral (equal parts ground limestone, bonemeal and salt) 2.5%. ‡Corn+mixed concentrate. †Milk.

with 1.23 pounds daily gain made by the hogs in Lot IV fed corn and tankage on pasture indicating that the ration fed Lot I in dry lot was superior to corn and tankage fed on pasture. The pigs fed on pasture, however, gained faster than did those fed corn and milk in dry lot which ration produced better results than corn supplemented with a mixture of: tankage 60%, corn 15%, cottonseed meal 15%, and alfalfa meal 10%, also fed in dry lot.

These results indicated the possibility of feeding weanling pigs in dry lot so that they will gain as fast as when on pasture and suggested the desirability of using better rations than are ordinarily fed (i. e. corn and tankage on pasture or corn supplemented with a mixture of tankage, oil by-products, and alfalfa meal in dry lot) particularly for a short period immediately following weaning in order to secure maximum gains.

During the summer of 1930 five lots of ten weanling pigs each were self fed shelled corn (yellow or mixed, usually yellow) in dry lot. Two different mixtures of feeds were used to furnish the protein needed to balance the corn consumed.

Supplement "A" consisted of equal parts of tankage, linseed oil meal, fish meal, liver meal, dried skimmilk and alfalfa meal. The mixture contained 40 to 45 per cent protein.

Supplement "B" was made up of tankage 3 parts, linseed oil meal 1 part and alfalfa meal 1 part and contained about the same percentage of protein as supplement "A."

It will be noticed that there were three feeds in Supplement "A," not found in Supplement "B" viz. fish meal, dried skimmilk and liver meal, previous experiments having indicated that each of these feeds

was especially valuable in rations for young pigs. Corn was placed in one compartment of the feeder and the mixed supplement in another so the hogs could choose between the carbonaceous and nitrogenous concentrates.

All lots were self fed a mineral mixture of equal parts precipitated calcium carbonate, dicalcium phosphate and salt. The nitrogenous supplements were fed to the various lots as follows:

	Supplement "A"	Supplement "B"
Lot I	First 28 days	Last 74 days
Lot II	First 56 days	Last 56 days
Lot III	First 74 days	Last 28 days
Lot IV	Entire period (112 days)	
Lot V		Entire period (112 days)

The results are summarized in Table 3.

TABLE 3.—RATIONS FOR WEANLING PIGS.

Dry Lot	July 24 to November 13 (112 days)				
Lot (10 Pigs)	I	II	III	IV	V
Average Initial Weight (lbs.)	30.9	30.7	30.9	30.9	31.1
Average Final Weight (lbs.)	208.13	209.40*	198.40	218.8	195.78
Avg. Daily Gain per Head (lbs.)	1.58	1.56	1.50	1 66	1.47
Avg. Daily Feed per Head (lbs.)	5.27	5.38	4.91	5.50	4.76
Feed per 100 lbs. Gain (lbs.)—					
Corn	278.05	273.31	258.03	267.03	265.51
Sup. "A"	19.07	36.09	59.76	64.33	------
Sup. "B"	35.83	23.92	10.50	------	58.38
Total	332.95	333.32	328.29	331.36	323.89

*Average nine pigs only: one pig removed from this lot October 16 because of not doing well. It was posted by the Veterinary Department and found to be affected with necro-enteritis. The entire record of this pig was eliminated from the data.

All lots gained at a satisfactory rate and the gains were produced on relatively small amounts of feed. Lot IV, fed corn and protein supplement "A" (equal parts of tankage, linseed oil meal, fish meal, liver meal, dried skim milk and alfalfa meal) for the entire period, made the largest daily gain; viz, 1⅔ pounds per head, while Lot V (check lot) receiving protein supplement "B" (tankage 3 parts, linseed oil meal 1 part, and alfalfa meal 1 part), made the smallest gain, approximately 1½ pounds per head daily—a difference of approximately 12 per cent.

Lot I fed supplement "A" for 28 days and then fed supplement "B" for the remainder of test gained 1.58 pounds per head per day which was as rapid as were the gains made by Lots II and III, which received supplement "A" for 56 and 74 days respectively, before being fed supplement "B."

There was little difference in the feed requirement per 100 pounds gain for the different lots, the smallest requirement being 323 pounds and the largest 333 pounds.

Lot IV fed supplement "A" for entire period consumed 5.15 pounds corn to each pound of supplement, while Lot V fed supplement "B" for entire period consumed 5.55 pounds of corn with each pound of supplement.

These data indicate, then, that as a supplement to corn, fed young pigs in dry lot, the addition of fish meal, dried skimmilk and liver meal to a protein supplement composed of tankage, linseed oil meal and alfalfa meal improved the ration and that this improvement was made for the most part during the first 28 days of the test or for the period immediately following weaning until a weight of approximately 100 pounds was reached.

Dried Skimmilk, Fish Meal and Liver Meal or Combination of These in Rations for Weanling Pigs

The next logical step in this study of rations for weanling pigs seemed to be to determine, if possible, which of the three feeds being studied, i. e. dried skimmilk, fish meal, or liver meal, was responsible for the advantage noted in the experiment just reported. Accordingly eight lots of pigs were self fed (free choice) shelled yellow corn and a mineral mixture composed of equal parts precipitated calcium phosphate, bone meal and salt in dry lot (University Hog Barn), and otherwise handled in exactly the same manner except that a different mixed protein supplement was self fed to each lot as follows:

		Supplement	
Lot I	A	Tankage	3 parts
		Linseed oil meal	1 part
		Alfalfa meal	1 part
Lot II	B	Supplement A	3 parts
		Dried skimmilk	1 part
Lot III	C	Supplement A	3 parts
		Fish meal	1 part
Lot IV	D	Supplement A	3 parts
		Liver meal	1 part
Lot V	E	Supplement A	3 parts
		Dried skimmilk 1	1 part
		Fish meal 1	
Lot VI	F	Supplement A	3 parts
		Dried skimmilk 1	1 part
		Liver meal 1	
Lot VII	G	Supplement A	3 parts
		Fish meal 1	1 part
		Liver meal 1	
Lot VIII	H	Supplement A	3 parts
		Dried skimmilk 1	1 part
		Fish meal 1	
		Liver meal 1	

Altogether 4 trials were conducted. While there were some minor differences in initial weights, number of pigs per lot, etc., in no respect was there any significant difference in the plan or conduct of each trial so that the average results of the four trials are reported in Table 4.

TABLE 4.—RATIONS FOR PIGS AT WEANING TIME.
Average 4 Trials, Dry Lot. 1931-32-33-34.

Lot	I	II	III	IV	V	VI	VII	VIII
Ration	Corn Prot. Sup. A	Corn Prot. Sup. B	Corn Prot. Sup. C	Corn Prot. Sup. D	Corn Prot. Sup. E	Corn Prot. Sup. F	Corn Prot. Sup. G	Corn Prot. Sup. H
Avg. Initial Wt. (lbs.)	41.8	41.6	41.0	41.7	41.9	41.6	41.7	42.0
Avg. Final Wt. (lbs.)	98.9	100.7	98.8	104.4	103.1	107.9	102.6	108.1
Avg. Daily Gain per Head (lbs.)	1.04	1.08	1.07	1.14	1.12	1.21	1.10	1.19
Avg. Daily Feed per Head (lbs.)	3.07	3.12	3.09	3.31	3.31	3.23	3.21	3.41
Feed per 100 lbs. Gain—								
Corn	234.14	206.00	237.19	223.13	232.64	209.39	230.87	223.07
Supplement	63.67	84.83	55.97	68.78	66.42	72.96	61.59	62.96
Total	297.81	290.83	293.16	291.91	299.06	282.35	292.46	286.03

The data reported in Table 4 indicate that the addition of either dried skimmilk, fish meal, or liver meal to a ration of yellow corn, supplemented with the standard protein supplement of tankage, linseed oil meal and alfalfa meal and minerals, self fed, improved the ration slightly for feeding pigs from weaning time until a weight of 100 pounds was reached and that the addition of two or more of these feeds produced slightly better results than when a single one was added. The data indicate further that liver meal was slightly better than dried skimmilk and that this dairy by-product was superior to fish meal.

Attention is called to the fact that when either dried skimmilk, fish meal or liver meal (or combinations of these) was fed the amount of these feeds used was small, so that the cost of producing 100 pounds gain was not excessive even though the cost per 100 pounds of these more or less specialty feeds was relatively high.

COMPOSITION OF FEEDS*

Feeding Stuff	Average Total Composition				
	Protein %	Fat %	Fiber %	N Free Extract %	Mineral Matter %
Corn—Dent Grade No. 2	9.4	3.9	2.2	68.4	1.3
Tankage—60% Protein grade	61.3	8.8	1.4	1.5	19.2
Linseed Oil Meal—Old process, all analyses	35.2	6.3	8.0	36.3	5.5
Cottonseed Meal—43% protein grade	43.2	7.2	10.6	27.0	5.5
Alfalfa Meal—Good	15.2	1.9	28.4	37.9	8.5
Buttermilk	3.5	0.6	----	4.5	0.8
Skimmilk—Centrifugal	3.7	0.1	----	5.0	0.8
Skimmilk—Dried	34.8	0.9	----	50.1	8.0
Fish Meal—Menhaden	56.3	9.2	0.9	5.2	20.2
Liver Meal	63.9	17.1	.81	5.2	6.07

*With the exception of liver meal, the above compositions are taken with permission of The Morrison Publishing Company from "Feeds and Feeding," Twentieth Edition, by F. B. Morrison. The analysis of liver meal was furnished by the Department of Agricultural Chemistry, University of Missouri.