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Comparison of ear corn plus supplement, shelled corn plus protein supplement and complete mixed rations for growing and finishing swine

Thomas R. Langford

To the Graduate Council:

I am submitting herewith a thesis written by Thomas R. Langford entitled "Comparison of ear corn plus supplement, shelled corn plus protein supplement and complete mixed rations for growing and finishing swine." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Animal Husbandry.

Charles S. Hobbs, Major Professor

We have read this thesis and recommend its acceptance:

Harold J. Smith, Lewis H. Dickson

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

December 7, 1960

To the Graduate Council:

I am submitting herewith a thesis written by Thomas R. Langford entitled "Comparison of Ear Corn Plus Supplement, Shelled Corn Plus Protein Supplement and Complete Mixed Rations for Growing and Finishing Swine." I recommend that it be accepted for nine quarter hours credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Animal Husbandry.

Charles S. Hobbs
Major Professor

We have read this thesis
and recommend its acceptance:

Harold J. Smith

Lewis V. Dickson

Accepted for the Council:

W. E. Spivey
Acting Dean of the Graduate School

COMPARISON OF EAR CORN PLUS SUPPLEMENT, SHELLED CORN PLUS PROTEIN SUPPLEMENT AND COMPLETE MIXED RATIONS FOR GROWING AND FINISHING SWINE

A Thesis

Presented to

the Graduate Council of

The University of Tennessee

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

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by

Thomas R. Langford

December 1960

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CHAPTER I

INTRODUCTION

There have been many new developments in swine feeding in the last five to ten years. New facts in swine nutrition have made it possible to greatly increase the efficiency of swine production.

The trend in the United States is toward confinement feeding of swine either on concrete or dirt lots. This is due in some degree to the value of land increasing to a point that it may be more profitable to produce grain instead of using it for swine pasture. Newer knowledge of swine nutrition has made it possible to compound rations which give results at least as good as finishing on pasture.

A trend is also developing toward greater use of complete mixed rations. This has been caused by a more specialized type of feeding operation. The higher cost of farm labor has also been a contributing factor. While there are many reasons both for and against complete mixed rations, the most important question for the producer is which will return the most profit?

This study was designed to determine the rate, economy and pounds of gain of a complete mixed ration compared to shelled corn and a supplement or ear corn and a supplement when fed to growing and finishing swine. These tests were also designed to determine the effect of adding vitamins to these rations.

A review of research shows that very few comparisons have been made between ear corn and shelled corn for feeding swine.

This research was conducted at the University of Tennessee

Experiment Station at Ames Plantation, Grand Junction, Tennessee, from the spring of 1958 to the fall of 1959.

The purposes of this experiment were: (1) to compare and evaluate the effect of ear corn, shelled corn and a complete mixed ration when fed to growing and finishing swine; (2) to further determine the effect of each one on rate of gain; (3) to compare the feed efficiency of each type of feed in terms of total pounds required and the total cost of each; and (4) to determine the effect of each type of feed on backfat thickness.

CHAPTER II

REVIEW OF LITERATURE

Clawson et al. (1957) showed that pigs self-fed corn and supplement containing meat meal required less supplement but slightly more corn to make 100 pounds of gain than those fed a supplement containing equal parts of soybean oil meal and cottonseed oil meal. There was no difference in the cost per hundred weight of gain between the two supplements when self-fed with shelled corn. Pigs fed complete mixed rations consumed more corn but less supplement than those self-fed corn and supplement. However, the cost of grinding and mixing markedly increased the cost of gain on pigs fed the mixed rations.

Conrad et al. (1959) found that pigs fed complete mixed rations on concrete grew four per cent faster, but that pigs fed shelled corn free choice made more efficient gains by requiring 3 per cent less feed. Due to the saving in feed and the saving of the grinding and mixing cost, the feeding of free choice rations on concrete from weaning to market resulted in a saving of $0.60 for every 100 pounds of pork produced. A detailed appraisal of the results showed that pigs on seven out of nine experiments grew faster on complete mixed rations. However, hogs fed free choice made more efficient gains in eight out of nine experiments and the feed costs were in favor of free choice feeding of shelled corn in seven out of nine experiments.

Hoefer et al. (1952) compared complete mixed rations, shelled corn with supplement free choice and pelleted rations. All rations were self-fed and consisted basically of corn, soybean meal, fish solubles, dried whey, complex mineral mix, supplementary B vitamins, antibiotic supplement and a vitamin A and D concentrate. To test the effect of ration quality on feed choice as well as animal performance, the supplementary B vitamins and the antibiotics were omitted from two rations. Their work showed a definite advantage where the supplementary B vitamins were added to all three rations. No significant difference in rate of gain was noted between pigs fed shelled corn compared to those fed the complete mixed feed.

Beeson et al. (1956) reporting on three experiments showed that the difference in feed cost for 100 pounds of gain was $1.04 less on pigs self-fed shelled corn and a complete mixed feed. This difference was largely due to the cost of grinding and mixing. Average daily gain was approximately the same. Feed required per 100 pounds gain was increased slightly by feeding the complete mixed ration. There was no advantage either in rate of gain or feed costs per 100 pounds of gain in starting pigs in dry lot on complete mixed rations after a weight of 45 pounds then changing to a free choice ration.

Pond (1959) found that pigs on pasture fed complete mixed rations gained 1.35 pounds per day while pigs receiving corn and supplement free choice gained an average of 0.93 pounds per day. Daily

feed consumed by each lot was below what would be expected of pigs in dry lot. It was assumed that a substantial proportion of their total feed intake was from pasture. He further indicates that pigs show a definite preference for feed containing sucroflavor when a complete mixture was supplied but the poor palatability of the unmixed protein supplement was not improved by sucroflavor.

Rutledge (1959) found the most economical gains were produced by pigs fed a protein supplement free choice with shelled corn either in pelleted or meal form. However, the feeding of a complete mixed ration, pelleted or meal, resulted in considerably faster gains throughout the entire feeding period. Although differences were not great, the pelleting of both the complete mixed ration and the protein supplement resulted in a lower cost per 100 pounds gain than did the meal form of these feeds. Pelleting did not appear to influence the rate of gain or efficiency of feed utilization from weaning to 120 pounds but increased gains from 1.84 pounds per day for those fed the meal form to 1.95 pounds per day for the pigs fed the pelleted feed during the second phase from 120 pounds to market weight. A saving of over 40 pounds feed per 100 pounds gain was also associated with the pelleted ration during the latter growth period.

Robison (1955) stated self-fed pigs required less feed per unit of gain than hand fed pigs when shelled corn was used and more feed per unit of gain when ground shelled corn was used. In first and second experiments, pigs fed a mixture of ground shelled corn and

supplement were ready for market five days earlier but required 4.0 and 10.5 per cent more feed per 100 pounds gain, respectively, than pigs self-fed shelled corn and supplement separately. When the pigs were hand fed, there was no saving in feed from grinding the corn in one experiment and a saving of only 1.2 per cent per unit of gain in the other. The pigs having ground shelled corn ate more feed daily per head and were ready for market six to eight days earlier in both experiments than those having shelled corn.

Aubel (1957) compared shelled corn and supplement with a complete mixed ration in both meal and pelleted form with hogs grazing sudan grass. He found that daily feed consumption of the free choice fed pigs was 3.1 pounds less than those fed pellets and 5.9 pounds less than those fed the meal mixture. The pigs fed the pellets and the complete mixture gained 0.19 of a pound more each day than the free choice fed pigs. The free choice fed pigs required 19 pounds more total feed than pigs fed pellets and 2.9 pounds more than pigs fed the complete mixture. In this experiment, complete mixtures of corn and protein supplement both pelleted and unpelleted, increased the daily rate of gain and reduced the feed consumed per 100 pounds gain. However, grinding, mixing and pelleting costs were not computed but should be considered when applying these results.

Becker et al. (1957) compared the effects of feeding a complete ration (mixed ground corn and supplement) versus free choice rations (shelled corn and supplement) on rate and efficiency of gain of 240

pigs fed during various stages of the feeding period. Their results show that complete mixed rations supported the most rapid gains both in dry lot and on pasture. Also the pigs fed complete rations on pasture gained considerably faster than pigs fed free choice on pasture. Apparently, most of this difference resulted from difference in feed intake since there was only slight variation in feed efficiency. The most economical gains were made by pigs fed a free choice ration on pasture; this lower cost was due to greater feed efficiency and elimination of grinding and mixing costs.

Hutchinson (1955) compared shelled corn and supplement A free choice with a complete mixed ration using 26 pigs weighing 115 pounds. Pigs were divided into equal lots of 13 each and fed on dirt from December 24, 1957, to February 18, 1958. Daily gains on the complete mixed ration was 1.48 as compared to 1.27 for shelled corn and supplement A. Feed per pound of gain was 4.21 for shelled corn and 4.19 for the mixed ration. Cost per 100 pounds of gain was $9.92 for shelled corn and supplement A whereas cost on the complete mixed feed was $10.14 which included $0.20 charge per 100 pounds for grinding and mixing.

Wallace et al. (1957) used 30 pigs to compare shelled corn and supplement free choice with complete mixed feeds. Pigs were run in wooded lots with free access to green forage. Pigs fed the complete mixed ration gained significantly faster than pigs fed free choice. In so doing they consumed an average of almost one pound

more feed per head daily and required 0.23 pound more feed per pound of gain. Pigs fed the complete ration converted the feed to pork less efficiently than pigs fed free choice. Cost and returns indicated the free choice method of feeding was more economical. Feed cost per 100 pounds gain averaged $1.76 less for the group fed shelled corn free choice.

Vitamins. Robinson (1953) studied the effect of vitamin B_{12} supplements fed to pigs on pasture. Pigs were carried from 32 to 220 pounds in weight. During their suckling period they had been creep fed a ration containing a B_{12} and antibiotic supplement and a B vitamin concentrate; after pigs reached 120 pounds the ration was made up to contain 12 and 14 per cent protein. There were negligible differences in the feed consumed daily per head, in the rapidity of gain and in the earliness of marketing. There was no difference in the amount of feed required per unit of gain in between pigs receiving vitamin B_{12} and pigs receiving no B_{12} in their ration.

Robinson (1954) found when vitamin B_{12} was added to a ration for pigs weighing between 46 and 120 pounds, they gained 0.17 of a pound more daily per head and required 15.57 pounds less feed per 100 pounds of gain than those without the vitamin B_{12}. When they were between 120 and 215 pounds in weight, the pigs fed vitamin B_{12} supplement gained 0.08 pounds more daily than those without the B_{12} vitamin. In five experiments the response was so small it did not pay to use vitamin B_{12} supplement after the pigs reached a weight

of 120 pounds. He concluded a ration without animal protein will likely need added vitamin B_{12} for young pigs.

McMillen et al. (1949) found that rations containing no niacin produced pigs that slowed down in growth within one week, diarrhea followed soon afterward and the large intestines were thickened and necrotic by the sixth to eighth week. Supplementing rations with niacin cured this intestinal trouble in two to three weeks. In cases of severe niacin deficiencies the appetite was so low that deficiencies of other B vitamins occured. Thus, he concluded the use of the other B vitamins is important in treating niacin deficiencies.

Catron et al. (1953) considered the effects of certain antibiotics and vitamin B_{12} on pantothenic acid requirements for growing and fattening swine. He fed 4.1 mg. of pantothenic acid in the basil ration. Then levels of 1,2,3,4 mg. of pantothenic acid per pound of ration were studied. A corn-soybean oil meal ration assaying as low as 3.7 mg. of pantothenic acid per pound of ration was fed without producing any of the characteristics pantothenic acid deficiency symptoms. No significant differences in gain or feed efficiency was produced with added amounts of pantothenic acid when the ration contained adequate amounts of vitamin B_{12} or antibiotics. He concluded that vitamin B_{12} and pantothenic acid exert a "sparing" action on each other in the absence of aureomycin. With healthy undepleted pigs weighing 35 to 45 pounds, a 14 per cent

protein, corn-soybean oil meal ration balanced in other respects and containing adequate amounts of vitamins B_{12} and aureomycin need not be supplemented with pantothenic acid for optimum growth.

Barnhart et al. (1954) found there were no significant differences in rate of gain and feed efficiency between pigs fed 2, 3, 4, 5, 6, 7 mg. of pantothenic acid. Neither were there any significant differences in the hemoglobin, red blood cell count, white blood cell count, differential white blood cell count, hematocrit or clotting time. The amount of calcium pantothenate excreted when pigs weighed 75 pounds was found to be closely related to the level of pantothenic acid the pigs were receiving in their ration. No pantothenic acid deficiency symptoms were observed in any of the pigs.

CHAPTER III

EXPERIMENTAL PROCEDURE

In Experiment I, 18 crossbred pigs weighing 46 pounds were allotted to six different lots according to breed, sex and weight.

Lots 1 and 2. Ear Corn Plus Supplement--Free Choice

Lots 3 and 4. Shelled Corn Plus Supplement--Free Choice

Lots 5 and 6. Complete Mixed Feed

In Experiment II, 18 crossbred pigs weighing 56 pounds were allotted to six different lots according to breed, sex and weight.

Lots 1 and 2. Ear Corn Plus Supplement--Free Choice

Lots 3 and 4. Shelled Corn Plus Supplement--Free Choice

Lots 5 and 6. Shelled Corn Plus Supplement Plus Vitamin B_{12} and B Vitamins 2-4-9-C[a]

All pigs in both experiments were identified by ear notch according to the United States Department of Agriculture system of ear notching. All pigs were in apparent good health and in a thrifty condition. All pigs were vaccinated for cholera before going on test. All pigs were self-fed on concrete. Each pen was equipped with automatic waterers and self-feeders. Ear corn was fed in a homemade self-feeder. The shelled corn was fed using a commercial type self-feeder.

Pigs were weighed every 14 days until they reached about 180 pounds and then at weekly intervals. The pens were cleaned

daily. In the summer, a soaker hose was hung overhead and used for cooling the pigs.

The basic supplement used in both experiments contained meat and bone meal, soybean oil meal, alfalfa meal, minerals, salt and antibiotics (Table I). This supplement was mixed with the ground shelled corn to formulate the mixed ration for lots 5 and 6 of Experiment I. The same source of corn that was fed on the ear was also shelled for the other lots. The pounds of ear corn required to produce 56 pounds of shelled corn was determined by weight taken of the ear corn before shelling and of the shelled corn.

Backfat probes were taken at the seventh rib and the pigs removed from the experiment as they reached or exceeded 200 pounds.

TABLE I

COMPOSITION AND COST OF BASIC SUPPLEMENT

	Cost per unit	Amount	Cost per pound	Total cost
Meat and bone meal (50 per cent)	$105.00 T	300 lbs.	$ .0525	$15.75
Soybean oil meal (44 per cent)	$ 65.00 T	300 lbs.	$ .0325	$ 9.75
Alfalfa meal (17 per cent)	$ 80.00 T	100 lbs.	$ .04	$ 4.00
Salt	$ 1.40 CWT	16 lbs.	$ .014	$ .22
Feeding limestone	$ 14.00 T	35 lbs.	$ .007	$ .24
Steam bone meal	$ 92.00 T	35 lbs.	$ .046	$ 1.61
Trace Mineral premix	$ .95 lb.	3 lbs.	$ .95	$ 2.85
B vitamins supplement 2-4-9-C[a]	$ .325 lb.		$ .325	$ .325
Vitamin B_{12} supplement	$ .14 lb.	_____	$ .14	$ .14
		789 lbs.		$34.42

Cost per pound: $ 0.0436

Cost per ton: $87.20

[a]Contained per pound: 2 grams of riboflavin
4 grams calcium pantothenate
9 grams niacin
10 grams choline chloride

CHAPTER IV

RESULTS AND DISCUSSION

In Experiment I and II (Table II) the pigs fed ear corn plus supplement gained 1.74 pounds per day compared to 1.65 pounds per day for those fed shelled corn plus supplement. Pigs fed a complete mixed ration gained 1.55 pounds per day. These findings disagree with those of Conrad (1959) who showed that pigs fed a complete mixed ration on concrete grew 4 per cent faster. Beeson (1956) showed no significant difference in rate of gain when pigs were fed shelled corn and supplement and a complete mixed ration. Rutledge (1959) found that feeding a complete ration in either meal or pellet resulted in considerably faster gains throughout the entire feeding period. Becker (1958) obtained gains of 1.48 pounds per day for pigs fed a complete mixed ration compared to 1.27 pounds per day when pigs were fed shelled corn and supplement A.

In Experiment I (Table III) an increase in rate of gain was obtained when a B vitamin supplement was added to the shelled corn and supplement ration. However, there was only two treatments and no definite conclusion can be drawn from this test. It does indicate that B vitamin supplementation may have a place in swine feeding. Robinson (1954) found that adding vitamin B_{12} to the ration of pigs weighing between 46 and 120 pounds increased daily gain 0.17 pound per day.

TABLE II

SUMMARY OF PERFORMANCE OF PIGS FED EAR CORN, SHELLED CORN, COMPLETE MIXED RATION AND SHELLED CORN PLUS B VITAMIN PREMIX

Ration	Number of animals	Average weight per animal	Average final weight	Daily gain	Feed per CWT gain	Feed cost per CWT gain	Average backfat probe
		Pounds				Dollars	Inches
Ear corn plus supplement	11	52	207.8	1.74	428.0	$10.34	1.62
Shelled corn plus supplement	12	51.4	207.6	1.65	395.7	$10.12	1.52
Complete mixed	6	45.7	203.8	1.55	404.9	$11.13	1.44
Shelled corn plus supplement plus B vitamin premix	6	59.3	209.0	1.83	380.0	$ 8.94	1.52

TABLE III

SUMMARY OF PERFORMANCE OF PIGS FED EAR CORN, SHELLED CORN, COMPLETE MIXED RATION

Experiment I

Ration	Number of animals	Average weight per animal	Average final weight	Daily gain	Feed per CWT gain	Feed cost per CWT gain	Average backfat probe
		Pounds				Dollars	Inches
Ear corn plus supplement	5	46.4	206.4	1.75	444.0	$11.42	1.67
Shelled corn plus supplement	6	45.5	207.3	1.69	386.0	$10.19	1.46
Complete Mixed ration	6	45.7	203.8	1.55	405.0	$11.13	1.44

TABLE IV

SUMMARY OF PERFORMANCE OF PIGS FED EAR CORN, SHELLED CORN PLUS B VITAMIN PREMIX

Experiment II

Ration	Number of animals	Average weight per animal	Average final weight	Daily gain	Feed per CWT gain	Feed cost per CWT gain	Average backfat probe
		Pounds				Dollars	Inches
Ear corn plus supplement	6	57.5	209.2	1.72	413	$9.25	1.56
Shelled corn plus supplement	6	57.3	207.8	1.61	405	$9.32	1.57
Shelled corn plus supplement plus B vitamin premix 2-4-9-C	6	59.3	209.0	1.83	380	$8.94	1.52

LOT 1, EXPERIMENT II

Ear Corn

Pig	Litter number	Sex	Weights 1-9	1-23	2-9	2-23	3-9	3-23	4-6	4-16	Average daily gain	Backfat thickness
			Pounds									Inches
120	1	G	42	53	68	90	111	138	167	198	1.61	1.4
20	8	G	58	73	98	126	146	172	207		1.71	1.4
20	1	B	73	91	129	155	185	213			1.92	1.4
Total			173							618		
Average			58							206	1.73	1.4

Total gain: 445 pounds

Number animal days: 257

Pounds of ear corn consumed:	2057		
Pounds of shelled corn at 76 pounds per bushel equivalent:	1516		
Per 100 pounds gain		341	
Cost per 100 pounds gain @ 1.786 cent per pound			$6.09
Pounds of supplement consumed	321		
Per 100 pounds gain		72	
Cost per 100 pounds gain @ .0426 cent per pound			$3.07
Total per 100 pounds gain		413	$9.16

LOT 2, EXPERIMENT II

Ear Corn

Pig	Litter Number	Sex	Weights 1-9	1-23	2-9	2-23	3-9	3-23	4-6	4-16	Average daily gain	Backfat thickness
			Pounds									Inches
20	6	G	59	77	108	133	159	185	222		1.87	1.5
120	3	B	52	61	79	103	128	155	181	200	1.52	1.5
20	10	B	61	75	102	131	156	192	215		1.77	1.8
Total			172							637		
Average			57							212	1.72	1.60

Pounds ear corn consumed:	2178		
Pounds shelled corn at 76 pounds per bushel for ear corn:	1605		
Per 100 pounds gain		345	
Cost per 100 pounds gain @ 1.786 cents pound			$6.16
Pounds supplement consumed:	361		
Per 100 pounds gain		78	
Cost per 100 pounds gain @ .0425 cent pound			$3.32
Total per 100 pounds gain		423	$9.48

LOT 3, EXPERIMENT II

Shelled Corn

Pig	Litter number	Sex	Weights 1-9	1-23	2-9	2-23	3-9	3-23	4-6	4-16	4-28	Average Daily Gain	B.F.
			Pounds										In.
120	6	G	53	62	79	97	112	134	158	176	202	1.37	1.5
20	5	B	70	93	122	153	177	208				1.89	1.7
120	7	B	50	58	75	97	118	143	173	191	215	1.51	1.6
Total			173								625		
Average			58								208	1.55	

Total gain: 452 pounds

Number animal days: 291

Pounds shelled corn consumed:	1538		
Per 100 pounds gain		340	
Cost per 100 pounds gain @ 1.96 cents lb.			$6.66
Pounds supplement consumed:	243		
Per 100 pounds gain		54	
Cost per 100 pounds gain @ .0430 cent lb.		___	$2.32
Total per 100 pounds gain		394	$8.98

LOT 4, EXPERIMENT II

Shelled Corn Plus B Vitamin Premix

Pig	Litter number	Sex	Weights 1-9	1-23	2-9	2-23	3-9	3-23	4-6	Average daily gain	Backfat thickness
			Pounds								Inches
20	11	G	59	76	101	129	156	184	220	1.85	1.6
20	4	B	59	85	119	150	178	209		2.05	1.4
20	6	G		67	90	117	139	169	199	1.81	1.3
Total			185						628		
Average			62						209	1.90	1.43

Total gain: 443 pounds

Number animal days: 233

Pounds shelled corn consumed:	1410		
Per 100 pounds gain		318	
Cost per 100 pounds gain @ 1.96 cents lb.			$6.23
Pounds supplement consumed:	309		
Per 100 pounds gain		70	
Cost per 100 pounds gain @ .04424 cent lb.		___	$3.09
Total per 100 pounds gain		388	$9.32

LOT 5, EXPERIMENT II

Shelled Corn

Pig	Litter number	Sex	Weights 1-9	1-23	2-9	2-23	3-9	3-23	4-6	4-16	Average daily gain	Backfat thickness
			Pounds									Inches
20	2	G	63	84	108	137	162	186	212		1.71	1.5
20	12	G	64	85	112	135	165	191	209		1.67	1.6
120	2	B	44	54	77	104	130	158	187	201	1.62	1.5
Total			171							622		
Average			57							207	1.66	1.53

Total Gain: 451 pounds

Number Animal Days: 271

Pounds shelled corn consumed:	1566		
Per 100 pounds gain		347	
Cost per 100 pounds gain @ 1.96 cents lb.			$6.80
Pounds supplement consumed:	309		
Per 100 pounds gain		69	
Cost per 100 pounds gain @ .0428 cent lb.		___	$2.95
Total per 100 pounds gain		416	$9.75

LOT 6, EXPERIMENT II

Shelled Corn Plus B Vitamin Premix

Pig	Litter number	Sex	Weights 1-9	1-23	2-9	2-23	3-9	3-23	4-6	4-16	Average daily gain	Backfat thickness
			Pounds									Inches
20	3	G	61	84	116	151	179	216			2.12	1.6
20	7	G	65	84	111	140	167	208			1.96	1.6
120	4	B	45	59	68	94	118	148	184	202	1.62	1.6
Total			171							626		
Average			57							209	1.87	1.6

Total Gain: 455 pounds

No. Animal Days: 243

Pounds shelled corn consumed:		1433	
Per 100 pounds gain			315
Cost per 100 pounds gain @ 1.96 cents lb.			$6.17
Pounds supplement consumed		256	
Per 100 pounds gain			56
Cost per 100 pounds gain @ .0445 cent lb.			$2.49
Total per 100 pounds gain			371 $8.66

In these two experiments, the feed required to produce 100 pounds of gain for the pigs fed ear corn and supplement was 428 pounds. The pigs fed shelled corn and supplement required 396 pounds to produce 100 pounds gain. In the first experiment (Table III), pigs fed the ear corn and supplement required to produce 100 pounds of gain was 444 pounds. Pigs fed shelled corn and supplement required 386 pounds to produce 100 pounds gain. The pigs fed the complete mixed ration required 405 pounds to produce 100 pounds gain. In the second experiment (Table IV), the pigs receiving shelled corn and supplement plus B vitamin supplementation required only 380 pounds of feed for 100 pounds of gain. This compared to 413 pounds of ear corn and supplement required to produce 100 pounds gain. Shelled corn and supplement without the B vitamin supplementation required 405 pounds.

Very little difference in the feed cost per 100 pounds gain was found between the pigs fed ear corn and shelled corn, $10.34 and $10.12 per hundred weight, respectively. In the comparison of ear corn, shelled corn and a complete mixed ration in the first experiment, the costs were $11.42, $10.91 and $11.13, respectively.

In Experiment II comparisons of ear corn plus basic supplement, shelled corn plus basic supplement and shelled corn plus basic supplement with B vitamins added, showed the differences in gain and feed costs were in favor of the lots receiving the added vitamins. The feed costs per hundred weight gain were $9.25, $9.32 and $8.94, respectively.

Conrad et al. (1959) also found the pigs fed shelled corn free choice made more efficient gains by requiring three per cent less feed. He also found a saving of $0.60 for every 100 pounds of pork produced.

Beeson et al. (1956) reporting on three experiments showed that a difference in feed cost for 100 pounds of gain was $1.04 less on pigs self-fed shelled corn and a complete mixed feed. He indicated this difference was due largely to the cost of grinding and mixing.

Becker (1958) reported the feed efficiency for pigs fed shelled corn was 419 pounds per 100 pounds gain whereas efficiency for pigs on a complete mixed ration was 419 pounds per 100 pounds gain. Feed cost for shelled corn was $9.92 per 100 pounds gain compared to $10.14 per 100 gain. This included $0.20 charge for grinding and mixing. A further detailed appraisal of these comparisons of shelled corn and complete mixed ration showed that in eight out of nine experiments, the shelled corn free choice pigs made the more efficient gains. Also, the feed cost was in favor of shelled corn free choice seven out of nine times.

In both Experiment I and II, ear corn compared very favorably with shelled corn in cost of gain and rate of gain.

CHAPTER V

SUMMARY

For the first experiment, 18 crossbred pigs weighing 46 pounds each were allotted at random to six different lots according to breed, sex and weight. These lots were assigned at random in duplicate to the following treatments:

Lots 1 and 2. Ear Corn Plus Supplement--Free Choice

Lots 3 and 4. Shelled Corn Plus Supplement--Free Choice

Lots 5 and 6. Complete Mixed Ration--Ad-lib

For the second experiment, 18 crossbred pigs weighing 56 pounds each were allotted to six different lots according to breed, sex and weight. These lots were assigned at random in duplicate to the following treatments:

Lots 1 and 2. Ear Corn Plus Supplement--Free Choice

Lots 3 and 4. Shelled Corn Plus Supplement--Free Choice

Lots 5 and 6. Shelled Corn Plus Supplement Plus B Vitamins 2-4-9-C--Ad-lib

Under the conditions of this study, satisfactory gains and economy of gains can be obtained by self-feeding ear corn. These gains and costs are similar to those resulting from feeding of shelled corn. Under conditions of this test, no advantage was shown when the ration was ground and mixed over the shelled corn and supplement self-fed free choice. In the comparison of shelled corn to ear corn, similar

results were obtained for rate of gain and feed efficiency and costs for growing and finishing swine. This experiment showed that cost should be considered along with rate of gain which is highly correlated to feed efficiency. However, the most efficient converters of feed may not be the cheapest. The feed required per hundred weight of gain for finishing swine in this test may appear higher than many, but the cost per hundred weight gain was lower and compared favorably with the most efficient rations. When a vitamin premix (2-4-9-C) was added to the supplement in Experiment II, slight differences in daily gain, feed efficiency and cost of gain were found in favor of the added vitamins. This result is based on a one year trial and must be repeated before conclusions can be drawn.

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