An Investigation in Feeding Pigs, and a Comparison of Breeds.

A Thesis

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By

Eugene Estes Hawley

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Assisted by Herbert E. Lattig.

Nature of the Experiment.

Twenty-four pure-bred pigs, raised on the University farm, were used in this experiment. Twelve of them were Poland Chinas and twelve were Duroc Jerseys. They ranged in size from 32 to 97 pounds, the average being 65.9 pounds.

They were divided into four pens of six each, three Polands and three Durocs in each pen. Eighteen were boars, all but four of which were castrated, leaving one boar in each pen.

As nearly as possible, the pigs were divided into equal groups, so that they would be uniform, and so that one pen would not have an advantage over the other. The initial weights of the pens were;- 407, 399 384, and 398 respectively.

Feeding periods were made as regular as possible . The feeding was done in the morning between six and seven o/clock, and about four-thirty in the evening. Outside factors that would influence the results in any way were eliminated, as far as possible.

The pens were made on the Latah County Fair grounds, and the race horse barns were used as shelter, Each lot had two stalls, one for feeding and one for sleeping pens, and the two stalls were connected by a small hole cut in the partition. Cinders were spread on the floor of the feeding pen and straw was used for bedding, in the sleeping pens.

All feeding was done in the sheds, except the last two weeks, when the frost came out of the ground and the pens became very muddy.

Each lot had a pen of about twenty by thirty feet for exercise.

Object of The Experiment.

The object of this experiment, was to determine the value of different feeds; that is, their relative value in fattening and growing pigs.

There has been many theories advanced as to the value of barley, shorts, tankage, alfalfa hay, corn, wheat, and potatoes. Also there has been many inquiries about warming, cooking, and mixing feeds.

This experiment was planned to cover as many of these points as possible; and data was also taken on the relative values of breeds, as to their fattening qualities and their ability to use feed to the best advantage.

The following results should not be taken as a criterion, without further investigation, but it is felt that the data obtained will help solve some of the problems of swine feeding.

Feeds Used.

Barley, shorts, and tankage were used in the basic ration in the proportion of- barley 14 parts, shorts 7 parts, and tankage 2 parts, by weight. The barley was all rolled or ground, with the exception of about 800 pounds. The shorts was of a fairly good grade; and the tankage was the grade produced by the Hagen and Cushing packing plant, containing about 30 % protein.

The potatoes used were small and of little value except for feed. They were cooked in a big cooker, one sack at a time, just enough water being used to cover the potatoes in the cooker. They were fed cold and with the exception of two or three days never froze, and when they did were thawed before feeding.

The alfalfa hay used was of ordinary quality, bought on the Moscow market. The hay was fed in a rack made for that purpose, and placed in the feeding pen where the pigs had acess to it at all times.

Feeds of Different Lots.

Lot I;- This lot received barley, shorts, and potatoes. Sufficient potatoes were used to replace about one third of the grain ration, as compared with lot four.

Lot 2;- This lot received barley, shorts, and alfalfa hay. The hay was placed in a rack where the pigs could have access to it at all times.

Lot 3;- This lot received barley I4, shorts 7, and tankage 2 parts. The feed was mixed with enough water to make it into the consistency of slop, and the whole was warmed over a sheet iron stove to a fairly high temperature, but not hot enough to burn the pigs mouths. No water was given them aside from that mixed with the feed.

Lot 4;- This lot was fed the basic ration of barley I4, shorts 7, and tankage 2 parts by weight, mixed and fed cold. This was taken as the basic ration becausse it was considered to be the one most commonly used in this section.

Each lot received the same amount of water, and it was given to them at the same time as the grain, with the exception of lot three.

Cost of Feed

Barley	$28.00 PER TON.
Shorts	$28.00 per ton.
Tankage	$30.00 per ton.
Alfalfa Hay	$12.00 per ton.
Potatoes	$ .55 per ton.

It will be noticed here that the prices are very high, especially the grains, and this will account to some extent for the high cost of gains made in the experiment.

L O T I

Barley 2, Shorts I, Potatoes to replace one third of the grain

	Grain 70#	Potatoes 20#
Dec.I9 to 26,		
Dec.26 to Jan.2,	I77.5	I22.
Jan.2 to Jam.9,	I20.	I65.
Jan.9 to Jan.I6,	I26.	I64.
Jan.I6 to Jan.23,	I24.	I82.
Jan.23, to Jan.30,	I0I.	2I5.
Jan.30 to Feb.6,	I00.	I30.
Feb.6 to Feb.I3,	I32.	I45.

LOT.2.

Barley I4, Shorts7, Alfalfa Hay fed in feed rack.

Dec.I9, to 26,	Grain I44#	Alfalfa 29#
Dec.26, to Jan.2	I45.5	20.
Jan.2, to Jan.9,	I67	I0.
Jan.9, to Jan.I6,	I63.5	I0.
Jan.I6, to Jam.23,	I65.5	44.
Jan.23, to Jan.30,	I44	43.
Jan.30, to Feb.6,	I42	39.
Feb.6, to Feb.I3,	I66	I5,

The alfalfa ran out three days before the end of the experiment.

LOT 3.

Barley I4, Shorts 7, tankage 2. Warmed and fed as a slop.

Dec.I9, to Dec.26,	Grain I47#	Tankage I2.8I#
Dec.26, to Jan.2,	I52.5	"
Jan.2 to Jan.9,	I74	"
Jan.9, to Jan.I6,	I70	"
Jan.I6, to Jam.23,	I66	"
Jan.23, to Jan.30,	I44	"
Ja.30, to Feb.6,	I42	"
Feb.6, to Feb.I3,	I66	"

The total tankage was taken and the average taken for each week.

LOT 4

Barley14, Shorts 7, Tankage 2, Fed cold with no supplement.

Dec. 19 to Dec.26,	Grain 147#	Tankage 12.81
Dec 26 to Jan.2,	152.5	"
Jan.2 to Jan.9,	174	"
Jan.9 to Jan.16,	170	"
Jan.16 to Jan.23,	166	"
Jan.23 to Jan.30,	144	""
Jan.30 to Feb.6,	142	"
Feb.6 to Feb.13,	166	"

The total tankage was taken and the average allowed for each week.

Lot I

	1	2	3	4	5	6
	Duroc Jersey Barrow	Duroc Jersey Barrow	Duroc Jersey Barrow	Poland China Barrow	Poland China Sow	Poland China Boar
Dec.19.	42.5	67	85	63	72.5	77
Dec.26	46	73	93	69	80	83
Jan.2.	46	76	95	68	79	86
Jan.9.	51	81	102	75	83	93
Jan.16.	51	86	107	72.5	86	99
Jan.23.	56	90	112	76	93	107
Jan.30.	59	95	117	84	100	
Feb.6.	60	98	120	85	102	
Feb.13.	65	101	130	93	112	
Total Gain--	22.5	34	45	30	39.5	30

Lot 2.

	7	8	9	I0	II	I2
	Duroc Jersey Barrow	Duroc Jersey Barrow	Duroc Jersey Sow	Poland China Barrow	Poland China Barrow	Poland China Barrow
Dec.I9.	97	406	58.5	64	63	77
Dec.26.	I05	46	63.5	65	67	82
Jan.2.	I08	47	68	69	72	87
Jan.9.	II9	5 3	75	73	78	94.5
Jan.I6.	I25	55	77	79	8I	I0I
Jan.23.	I3I	59	83	82	85	I06
Jan.30.	I4I	67	92	92	95	
Feb.6.	I47	72	96	96	I00	
Feb.I3.	I58	74	I03	I03	I08	
Total-Gain-----	6I	34	54.5	39	45	29

Lot 3.

	I3	I4	I5	I6	I7	I8
	Duroc Jersey Sow	Duroc Jersey Barrow	Duroc Jersey Boar	Poland China Barrow	Ploand China Sow	Poland China. Sow.
Dec.I9.	32	62.6	73	72	72	72
Dec.26.	32.5	64.	82	77	77	76
Jan.2.	36	64	82	79	77.	77.5
Jan.9.	4I	76.5	88	88	84	83
Jan.I6.	42	8I	93	95	89	90
Jan.23.	46	85	95	98	93	94
Jan.30.	49	92		I05	I0I	I02
Feb.6.	5I	95		II2	I06	I05
Feb.I3.	54	I0I		II7	II6	II4
Total Gain---	22	22	37	45	44	4I.5

Lot. 4.

	I9	20	2I	22	24	25
	Duroc Jersey Boar	Duroc Jersey Barrow	Duroc Jersey Barrow	Poland China Barrow	Poland China Sow	Poland China Barrow.
Dec.I9.	75	64	67	7I	57	64
Dec.26.	76	67	69	74.5	58	66.5
Jam.2	8I.5	7I.5	7I	80	60	69
Jan.9.	90	74	76	88	63	76
Jan.I6.	96	78	79	9I	65	79
Jan23.	99	84	84	I0I	69	74
Jan.30.		9I	9I	I07	75	84
Feb.6.		9I	94	II2	76	92
Feb.I3.		96	98	I23	79	I0I
Total Gain----	24	32	3I	52	22	37

Results of the Experiment In Tabulated Form.

	Lot I	Lot 2.	Lot 3.	Lot 4.
Rations	Barley 2 p. Shorts I p. Potatoes	Barley 2 p. Shorts i p. Alfalfa	Barley I4 p. Shorts 7 p. Tankage i p.	Barley I4 p. Shorts 7 p. Tankage I p.
Total wt. beginning	747.0	399.0	384.0	398.0
Ave. Wt. " "	67.8	66.6	64.99	66.3
Total final wt.	6I6.0	652.0	597.0	596.0
Ave. final wt.	I02.6	I08.7	99.5	99.3
Total gain	20I.0	253.0	2I2.0	I98.0
Individual Ave. daily gain	.65	.83	.67	.63
Feed consumed Suppliment	Potatoes II28#	alfalfa 232#	Tankage I02.8#	Tankage I02.8#
Feed consumed Grain	946#	I22I#	I25I#	I25I#
Daily ration Suppliment	Potatoes 20.I	Alfalfa 4.I4	Tankage I.83	Tankage I.83
Daily ration Grain	I6.9	2I.8	22.I6	22.I6
Feed per I00# Gain Suppliment	Potatoes 56I#	Alfalfa 9I.2 #	Tankage 42.5#	Tankage 5I.9#
Feed per I00# Gain Grain	478 #	482 #	54I#	580#
Days Fed	56	56	56	56
Cost of feed	$I7.I9	$I8.47	$I9.05	$I9.05
Cost per I00 gain	$8.59	$ 7.30	$ 8.98	$ 9.62
Cost of Hogs @ $6.	$24.42	$24. I4	$23.04	$24.08
Gross ret. @ $7.	$43.I2	$45.64	$4I.79	$4I.72
Net profit-lot	$ I.4I	$ 3.03	$- .30	$-I.4I
Net profit -hog	$ .235	$ .505	$- .05	$- .235

The Experiment ran for 56 days, but one pig, a boar, was taken from each pen at the end of 35 days.

Comparison of Breeds.

	Duroc Jerseys.	Poland Chinas.
Initial weight	759.0#	825.0#
Finall weight	II92.0#	I279.0#
Gain	432.0#	454.0#
Average daily gain	.686#	.720#

One object of the experiment was to determine the difference of the breeds, if any, in regard to their ability of using their feed to the best advantage.

There were three Poland Chinas and three Duroc Jerseys in each pen. Four of the Boar pigs were not castrated, two of each breed; and one of these was placed in each pen. As has been stated, the boars were taken out on Jan. 23.

It should be stated here that the Poland Chinas were somewhat more uniform, in flesh and weight, than the Durocs and this no doubt had some effect on the results.

On the other hand the largest individual gains was made by a Duroc Jersey Barrow.

CONCLUSIONS.

No. I- That there is little profitin feeding swine with feeds at their present high prices. If the farmer expets to profit by feeding when feeds are high, he must raise the pigs to about one hundred pounds on cheap feeds, such as Alfalfa pasture and the minimum amount of grain. As the finishing costs about as much as it returns, the profit must be made on the first one hundred pounds gain.

No. 2- It has been proved, with-out doubt, that a protein suppliment is necessary on feeding hogs to advantage, and this experiment shows that there is a wide difference in the suppliments used. It was found that Alfalfa hay not only gave the largest returns, but was by far the cheapest. In this perticular case it determined the difference between profit and loss, the Tankage showing a loss in both lots. There might be a differince in feeding a Tankage with a high protein content, but the pigs did not take to it as they did to the Alfalfa.

No. 3- When a farmer has cull potatoes, or even when they are cheap, as they often are in this sectipn; he can feed them to his hogs at a profit. From observation during this experiment, it seems that potatoes cannot be a very great factor in fattening pigs untilthey weigh about one hundred pounds, as they do not have capaity to hold enough feed.

Considering that the potatoes formed one third of the ration, it took about I400 pounds, to make one hundred pounds gain on the pigs. It should be said here that the potatoes used, were of poor quality and very dirty; and if they had been washed no doubt the results would have been more satisfactory.

In this section it seems that the farmer should not feed tankage so long as he can raise Alfalfa. He will not only get as good, or better

returns, but the feeds will not cost so much.

No.4- When one calculates the cost of fuel and the time necessary to w warm the feed, there is nothing gained by warming. In feeding the highly carbonaceous feeds it seems that there is an excess of heat liberated, even more than the animal needs. In very cold sections there might be something gained by warming as it takes more body heat and even then one should have a large bunch in order to lower the cost per head.

No.5- The tables show that there is a great difference in the ability of different animals to use feed to the best advantage. In the same pen and under the same conditions exactly, on animal will make big gains while another will make small ones.

No.6- In comparing one breed with another we cannot say that one breed fed more economically than the other The Poland Chinas made the best gains, but we must remember that they were in the better shape to begin with. Also from the results of other stations it seems that there is no appreciable difference in the major breeds as a whole. It all seems to depend on conditions.

No.7- There seems to be a close connection between the condition of the pen, troughs, etc., and the gains made. There was two weeks in the latter part of the experiment when the pigs as a whole seemed to fall below the average gain, the frost had gone out of the ground at this time and the pens were in a very muddy condition; thus we conclude that it would pay the farmer to pay more attention to his feed lots.

No.8- The pigsalways show a craving for mineral matter in some form. They will eat such matter as soft coal, ashes, lime and such. In this experimentthey ate the cinders which were spread on the floor of the feeding pens.From this proof and from the experience of others it is evident that the farmer should keep some form of mineral before the pigs at all times where they can have ready access to it.

State	No. of pigs	# Feed per 100 # gain	Cost of 100# gain	Kind of Feed used
Michigan No. 243	12	42.1	$2.53	Cull Beans, cooked
Michigan 243	12	40.6	3.25	Cull Beans ½, Corn meal ½.
Florida		54.6	8.00	Corn alone.
Florida		101.81	8.00	Corn, Cull beans, Sorgum Green
S. Dekota 90	2	38		Shrunken Wheat.
S. Dekota 90	2	42		Good mature wheat.
S. Dekota 90	6	57.7	3.91	Barley.
S. Dekota 90	6	53.8	3.92	Barley and Rape.
S. Dekota 90	6	57.3	4.33	Barley, Rape, and Tankage.
D. ekota 90	6	46.2	4.08	Barley, Oil meal & Tankage
S. Dekota 90	6	1534	4.51	Barley, Skim milk, Tankage

State	No. of pigs.	# Feed per I00# gain.	Cost per I00# gain	Kind of feed used.
Kansas No. I92	72	62.5	$5.94	Corn alone ein a dry lot.
~~Kansas I92~~	59	55.6 corn. 7.I hay.	5.57	Alfqlfa Hay Corn In dry lot.
Kansas I92	I62	47.2	5.27	Corn & Tankage in dry lot
Kansas2 I92	I44	45.8	5.05	Corn, Shorts&Tankage in dry lot
Dom.OfCCanada Dep.of Agr.	5	445		Whole, Soaked 48 hours Peas, Barley, & Rye.
Same.	5	408		Whole and dry Oats, Barley, Peas, & Bran.
Same.2 IO	5	436		Ground, Soaked I2 hours Peas, Barley, and Rye.
Same. IO	4	356		Ground, and dry Oats, Barley, Peas, & Bran.
Same IO	4	388		Whole, Soaked 30 hours Oats, Barley, Peas, & Bran.
Same. IO	4	376		Ground, Soaked, 30 hours. Oats, Barley, Peas, & Bran.
Same. IO	4	360		Whole, Dry Oats, Barley, Peas, & Bran.
Same. IO	4	343		Ground, Dry Oats, Barley, Peas, & Bran.

State	No.	No.of Pigs.	# of Feed I00 # Gain.	Cost of Feed per I00# Gain.	Kind of Feed used.	
Perdue	I58	8	598	$6.3I	Homony Feeed Shorts	2 parts I parts
Perdue	I58	8	372	4.8I	Homony Feed Tankage	2 parts I parts
Perdue	I58	8	505	6.05	Corn meal Shorts	2 parts Iparts
Perdue	I58	8	45I	4.3I	Corn meal Tankage	20 parts I part.
Perdue	I37	8	375		Corn meal Linseed meal	8 parts I part.
Perdue	I37	8	367		Corn meal Soy bean meal	7 parts I part.
Perdue	I37	8	383		Corn meal Tankage	I5 parts I part.
Perdue	I37	8	36I		Corn meal Middlings	I part. I part.
Perdue	I37	8	744		Corn meal Skim milk	I part I.5 parts
Perdue	I37	8	972	3.65	Shell Corn Butter-milk.	
Perdue	I37	8	6I6	Cost of Grain 2.20	Shell corn Skim milk.	
Perdue	I37	8	450	Cost of Grain 3.2I	Shell Corn Rape pasture.	

State	No. of Pigs	Pounds feed per I00#gain	Cost per I00#gain	Kind of feed used.
Texas 78.	I0	76.2	$8.40	Corn chops alone.
Texas 78	I0	86.8	9.57	Corn Chops, Fermented.
Texas 78	I0	72.7	8.06	Corn chops 2/3 Cotton-seed meal 1/3 Fermented
Alabama I54		58.I	7.26	Corn alone.
Alabama I54		38.9	4.96	Corn-----9 parts Cotton-seed meal I part.
Alabama I54		35.4	4.72	Corn 2/3 Cotton-seed meal 1/3
Conn. 3I	2	Solids I4.8		Skim milk.
Conn. 3I	2	Solids I4.0		Whole milk poor in fat.
Conn. 3I	2	Solids I5.6		Whole milk rich in fat.
S.Dekota I00		77.I	4.60	Whole Speltz.
S.Dekota I00		52.9	3.50	Speltz and Corn.
S.Dekota I00		82.6	5.50	Ground Speltz.