Swine

Swine Feeding Investigations

EXPERIMENT I

The Effect of Varying Amounts of Antibiotics (Aureomycin-B_{12} Supplement) in the Protein Supplement for Swine on Sudan Pasture.

PROJECT 110

FINAL REPORT

C. E. Aubel

In recent years the use of antibiotics in swine nutrition has received much attention. Research has shown that different vitamin B_{12} antibiotic supplements stimulate gains.

Antibiotics have been shown to be effective in stimulating rate of gain as much as 18 percent and improving the feed efficiency up to 10 percent when fed in the rations of swine. Not so conclusive evidence has been obtained, however, to show that mere inclusion of an antibiotic in a feed insures the improvement in the well-doing of the pig, unless the antibiotic is fed in adequate amounts, which is from 5.0-7.5 mg. per pound of total feed.

Most swine feeders self-feed grain and a supplement, with the latter containing the protein, vitamins and minerals. The ratio of corn to protein supplement consumed becomes wider as the pigs mature; therefore, the amount of antibiotic furnished daily by a protein supplement fed free choice with corn will be different from the amount supplied by feeding an antibiotic in a complete ration. Usually pigs will eat daily a fairly constant amount of a protein supplement throughout the feeding period, but the amount of grain they eat increases in proportion to weight of the pigs.

This experiment was designed to determine the optimum level of antibiotic in the protein supplement for growing and fattening pigs. Aurofac, the aureomycin-B_{12} supplement produced by Lederle Laboratories, New York, was used as the source of antibiotic. This contained approximately 1.8 mg. of vitamin B_{12} and 1.8 grams aureomycin hydrochloride per pound.

The problem in feeding the antibiotic in this manner was to determine how much antibiotic supplement to put in a ton of protein supplement to supply 5 mg. per pound of total feed consumed, as recommended from nutrition studies with swine. If one assumes that pigs eat their feed at a ratio of 1 pound of protein supplement to 3.5 pounds of grain, then 27 pounds of Aurofac per ton of supplement would supply approximately 5 mg. of aureomycin hydrochloride per pound of feed consumed.

Five lots of 10 pigs each were started on sudangrass pasture at a weight of about 56 pounds. They were fed free choice on shelled corn and a protein supplement of 4 parts tankage, 4 parts soybean meal, 1 part cottonseed meal, and 1 part alfalfa meal. The protein supplement had a protein content of about 50 percent. A mineral mixture also was supplied, made of equal parts ground limestone, steamed bonemeal and salt.

The following levels of Aurofac were added to the protein supplement:

Lot 1—no Aurofac
Lot 2—15 pounds per ton
Lot 3—25 pounds per ton

Lot 4—35 pounds per ton
Lot 5—45 pounds per ton

The following table gives a summary of the results of this experiment.

Table 30.—The Effect of Varying Amounts of Antibiotics (Aureomycin-B_{12} Supplement) in the Protein Supplement on Weanling Pigs on Sudangrass Pasture.

Ration fed	Shelled corn, sudangrass pasture, min. mix (Self-fed)				
	Protein mixed supplt.	Protein mixed supplt. 15 lbs. aureo-B_{12} to 1 ton	Protein mixed supplt. 25 lbs. aureo-B_{12} to 1 ton	Protein mixed supplt. 35 lbs. aureo-B_{12} to 1 ton	Protein mixed supplt. 45 lbs. aureo-B_{12} to 1 ton
Lot number	1	2	3	4	5
No. pigs in lot	10	10	10	9	10
Av. initial wt. per pig	57.70	56.40	63.90	56.00	57.85
Av. final wt. per pig	194.00	195.30	209.50	201.90	205.50
Av. total gain per pig	136.30	136.90	145.60	145.90	147.65
Av. daily gain per pig	1.49	1.50	1.60	1.60	1.62
Av. daily ration per pig:					
Corn	4.07	4.31	4.01	4.12	4.54
Protein supplt.	1.05	1.00	1.22	1.00	1.06
Feed consumed per 100 lbs. gain:					
Corn	272.19	287.07	251.03	256.34	280.39
Protein supplt.	70.35	66.76	76.51	63.26	65.35
Mineral mix	.14	.27	.12	.12	.17
Feed cost per 100 lbs. gain	$11.32	$11.78	$11.27	$10.75	$11.86

Feed prices charged: Shelled corn, $1.68 per bu.; mixed protein supplements in Lot 1, $90 per ton; mixed protein supplements with Aurofac in Lot 2, $95.25, Lot 3, $98.75, Lot 4, $102.25, and Lot 5, $105.75 per ton; Aurofac, 35c per lb.; mineral mixture, 3c per lb.

Observations

1. Feeding Aurofac at 15 pounds per ton of protein supplement produced no better response with the pigs than no antibiotic.
2. If the antibiotic were fed at near the recommended level or more, daily gains were increased and the efficiency of the feed was increased, except in Lot 5 where 45 pounds of antibiotic to the ton were fed. The amount of feed required per 100 pounds gain in this lot was about the same as when no antibiotic was fed and only slightly more than required by those getting nearer the recommended allowance.
3. The pigs receiving 25 pounds of Aurofac per ton of protein supplement consumed less corn and more protein supplement per 100 pounds gain than any other lot.
4. This experiment indicates that feeding the Aurofac mixed in the protein supplement and self-fed free choice with grain is a practical way to administer the antibiotic to growing fattening pigs.
5. About 25-35 pounds of Aurofac per ton of mixed protein supplement appear to be the correct amount. This amount is consistent with the amount recommended in a complete or total feed (5 mg. per pound of feed).

EXPERIMENT II—Summer 1953

The Effect of Antibiotics, Aureomycin-B_{12} Supplement, Terramycin and Vitamin B_2 Pre-mix in the Protein Supplement for Weanling Pigs on Sudan Pasture.

C. E. Aubel

Previous experiments have shown the effect of varying amounts of aureomycin-B_{12} supplement in the protein supplement for weanling pigs. The optimum amount has been between 25 and 35 pounds of Aurofac to a ton of mixed protein supplement. This supplies approximately 5 mg. of aureomycin per pound of total feed consumed, the amount usually recommended from nutrition studies.

This experiment was designed to get information on another antibiotic, terramycin, and on the feeding of a vitamin B_2 Pre-Mix supplement.

Four lots of pigs were fed. Lot 1 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. Lot 2 received a similar protein supplement with aureomycin added (as Aurofac) at the rate of 27 pounds to a ton. Lot 3 had a similar protein supplement with terramycin added as TM5 at the rate of 5 pounds per ton and Aurofac at the rate of 14 pounds per ton. These combined antibiotics provided the 5 mg. per pound of total feed usually recommended. Lot 4 received a similar protein supplement, with Aurofac added at the rate of 25 pounds per ton and a vitamin B_2 supplement containing riboflavin, niacin, pantothenic acid, choline chloride, and folic acid (Lederle's C-49) at the rate of 12 pounds per ton of supplement.

Table 31 gives the results of this experiment.

Table 31.—The Effect of Antibiotics, Aureomycin-B_{12} Supplement, Terramycin, and Vitamin B_2 Premixture in the Protein Supplement for Fattening Swine on Sudangrass Pasture.

(May 21, 1953-August 25, 1953—96 days)

Ration fed	Shelled corn, sudangrass pasture, mineral mixture			
	Protein mixed supplt.	Protein mixed supplt. 27 lbs. aureo-B_{12} per ton	Protein mixed supplt. 14 lbs. aureo-B_{12}, 5 lbs. TM5 per ton	Protein mixed supplt. 27 lbs. aureo-B_{12}, 12 lbs. C-49 per ton
Lot number	1	2	3	4
No. pigs in lot	10	10	10	10
Av. initial wt. per pig	40.80	41.20	39.90	41.70
Av. final wt. per pig	191.10	196.80	182.40	184.40
Av. total gain per pig	150.30	155.60	142.50	142.70
Av. daily gain per pig	1.56	1.62	1.48	1.48
Av. daily ration per pig:				
Shelled corn	3.94	4.40	3.87	3.81
Protein supplt.	.87	.85	.81	.91
Feed per 100 lbs. gain per pig:				
Shelled corn	251.82	271.85	261.05	256.83
Protein supplt.	55.88	52.69	55.08	61.45
Mineral mix	.12	.11	.09	.08

Observations

1. When aureomycin was added to the ration in Lot 2, the rate of gain was increased somewhat but the feed requirements per 100 pounds of gain were increased.
2. When the antibiotic supplied was both aureomycin and terramycin in Lot 3, the rate of gain was not so good as in Lot 1 where the antibiotic was only aureomycin. The feed consumption was about the same.
3. When the vitamin B_2 Pre-Mix was added to aureomycin, it resulted in no increased gains or decreased feed consumption. Daily gains were .14 pound less than when aureomycin was fed alone. In this experiment the addition of a vitamin B_2 Pre-Mix did not produce greater gains nor decrease feed consumption for pigs on forage in the summer.

EXPERIMENT III—Summer 1953

The Comparative Value of Common Sudangrass and Sweet Sudangrass as Pasture for Fattening Spring Pigs.

C. E. Aubel

This experiment was conducted the summer of 1953 with spring pigs on pasture. Its object was to compare quality of the two varieties of sudangrass.

Two lots were fed shelled corn and a mixed animal and plant protein supplement made of 4 parts tankage, 4 parts soybean meal, 1 part linseed meal, and 1 part alfalfa meal. Both were self-fed free choice. Lot 1 was pastured on common sudangrass pasture; Lot 2 on sweet sudangrass pasture.

The pastures were the same quality and stand. Both furnished ample green forage throughout the test. It was necessary to clip the pastures during the summer to get rid of headed-out stalks and provide good leafy forage. Both stood the dry weather equally and were relished equally by the pigs on them, as well as could be determined by observations.

Table 32 gives the results of this experiment.

Table 31.—The Effect of Antibiotics, Aureomycin-B_{12} Supplement, Sudangrass as Pasture for Fattening Spring Pigs.

(May 21, 1953-August 25, 1953—96 days)

Ration fed	Shelled corn and protein mixed supplement —and mineral mixture—	
	Common sudangrass pasture	Sweet sudangrass pasture
Lot number	1	2
No. pigs in lot	10	10
Av. initial wt. per pig	40.80	41.50
Av. final wt. per pig	191.10	194.50
Av. total gain per pig	150.30	153.00
Av. daily gain per pig	1.56	1.59
Av. daily ration per pig:		
Shelled corn	3.94	4.03
Protein supplt.	.87	.85
Feed per 100 lbs. gain per pig:		
Shelled corn	251.82	253.26
Protein supplt.	55.88	53.72
Mineral mix	.12	.11

Observations

1. The pigs made about the same daily gains in both lots and consumed almost exactly the same amount of feed per 100 pounds gain.
2. From the observations in this experiment, it is evident that either variety of sudangrass is a satisfactory forage for fattening spring pigs.

EXPERIMENT IV—Winter 1953

SUPPLEMENTARY REPORT

The Comparative Value of Corn and Whole and Ground Milo with Antibiotics as Swine Fattening Feeds.

C. E. Aubel

In many parts of Kansas sorghum grains are grown extensively for hog feeding. In previous feeding tests with hogs at this station, some sorghum grains have given excellent results when compared with corn. In 1950 Westland milo and Midland milo gave 12 percent greater daily gain than 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 again to compare sorghum grain with corn and to test antibiotics with sorghum grain.

Four lots of pigs were fed. 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. All lots were self-fed the grain and protein supplement free choice. The milo was an unidentified variety, straight elevator run. One lot received shelled corn, Lot 2 received whole milo, Lot 3 received coarsely ground milo from a burr mill, Lot 4 received ground milo. The protein supplement mixture for all lots contained 27 pounds per ton of aureomycin or Aurofac.

Table 33 gives the results.

Table 33.—The Comparative Value of Corn and Milo with Antibiotics as Swine Fattening Feeds.

(December 14, 1953-March 15, 1954—91 days)

Ration fed	Shelled corn, protein mixed supplt., mineral mix.	Whole milo, protein mixed supplt., mineral mix.	Ground milo, protein mixed supplt., mineral mix.	Ground milo, protein mixed supplt., 27 lbs. aureo-B_{12} per ton mineral mix.
Lot number	1	2	3	4
No. pigs in lot	10	10	9	9
Av. initial wt. per pig	51.90	51.70	53.11	52.55
Av. final wt. per pig	202.90	214.20	223.22	224.32
Av. total gain per pig	151.00	162.50	170.11	171.77
Av. daily gain per pig	1.65	1.78	1.86	1.88
Av. daily ration per pig:				
Grain	5.40	6.26	6.42	6.34
Protein mix	.89	.90	.91	.92
Feed per 100 lbs. gain per pig:				
Grain	325.82	350.89	339.64	323.42
Protein mix	54.17	50.76	48.85	48.77
Mineral mix	.08	.07	.06	.06

Observations

1. Feeding whole milo produced about 8 percent greater gains in pigs than produced by feeding corn.
2. The daily gains of the pigs receiving ground milo were about 12 percent greater than those of pigs fed corn.
3. Ground milo was more efficient than whole milo.
4. Adding aureomycin to the ration did not materially offset the daily gains but did reduce the amount of feed required per 100 pounds gain.
5. The milo was palatable. Each lot fed milo consumed more of it daily than the amount of corn consumed daily by the corn-fed lot.
6. Milo was a satisfactory grain in all respects and was better than corn for fattening pigs in this experiment.

EXPERIMENT V—Summer and Winter 1953-54.

The Value of Animal Fats in Hog Fattening Rations.

C. E. Aubel and D. Richardson

The surplus of animal fats is a problem. A major part of this fat is considered unfit for human consumption. In the past, one of the greatest uses for it has been in soaps. Detergents have largely destroyed this market. Increased use of vegetable oils instead of animal fats has further reduced the market.

Fats contain 2.25 times as much energy as carbohydrates. The addition of fat to swine rations should increase their energy content and consequently decrease the feed required to produce 100 pounds of pork.

To get information on this theory or subject, two experiments were conducted last summer and winter with an inedible animal fat added to the ration of growing fattening pigs. In these experiments an animal tankage that analyzed 27 percent fat was used in an animal and vegetable protein supplement. This supplement contained 4 parts high-fat tankage, 4 parts soybean meal, 1 part linseed meal, and 1 part alfalfa meal. This supplement then analyzed 10.65 percent fat. This was self-fed to pigs free choice with corn in one experiment and milo in another. The pigs during summer experiment were on green forage, whereas the pigs during the winter experiment were in the drylot.

A summary of the results follows:

Table 34.—The Value of Animal Fats in Hog Fattening Rations.

Ration fed	Summer 1953 (May 21, 1953-August 25, 1953) 96 days on sudangrass pasture —Shelled corn self-fed— Protein mixed supplt. plus mineral mix.	Summer 1953 (May 21, 1953-August 25, 1953) 96 days on sudangrass pasture —Shelled corn self-fed— Protein mixed supplt. plus animal fat plus mineral mix.	Winter 1954 (December 14, 1953-March 15, 1954) 91 days on drylot —Ground milo self-fed— Protein mixed supplt. plus mineral mix.	Winter 1954 (December 14, 1953-March 15, 1954) 91 days on drylot —Ground milo self-fed— Protein mixed supplt. plus animal fat plus mineral mix.
Lot number	1	2	3	4
No. pigs in lot	10	10	9	8
Av. initial wt. per pig	40.80	39.70	53.11	55.00
Av. final wt. per pig	191.10	188.60	223.22	214.00
Av. total gain per pig	150.30	148.90	170.11	159.00
Av. daily gain per pig	1.56	1.55	1.86	1.74
Av. daily ration per pig:				
Sh. corn	3.94	3.37		
Gr. milo			6.42	6.01

Prot. supplt.	.87	1.44	.91	1.11
Feed per 100 lbs. gain per pig:				
Sh. corn	251.82	217.59		
Gr. milo			339.64	344.33
Prot. supplt.	55.88	93.01	48.85	64.07
Minerals	.12	.12	.06	.07

When the pigs were on forage, there was little difference between the pigs not on a high-fat level and those that received extra fat in their protein supplement. The rate of gain was the similar and the feed consumption was practically the same. However, the fat-consuming pigs ate less corn than did the other lot.

Daily gains of the fat-fed pigs in the winter were somewhat less (about 6 percent) than gains of pigs not fed fats. Feed consumption was more fat-supplement consumed and a little more corn, than with the lot not getting surplus amounts of fat.

Observations

1. This experiment indicates that pigs may use extra amounts of fat in their rations if the price is low enough compared with corn to justify the cost of the extra handling and mixing.
2. It is thought that 10 or 15 percent of the ration could be fat and that that much could be fed mixed with ground corn, as well as in tankage, subsequently used in mixed protein supplements.

COL. W. A. HARRIS

by

C. W. McCampbell

William Alexander Harris, brilliant soldier, distinguished engineer, resolute legislator and master Shorthorn breeder born near Luray, Va., October 29, 1841, graduated from Columbia College (now George Washington University), Washington, D.C., in 1859, spent six months as a civil engineer on a preliminary inter-ocean canal survey in Central America, then entered Virginia Military Institute at Lexington, Va.

Virginia seceded in April 1861. The senior class of Virginia Military Institute, of which Colonel Harris was a member, was graduated immediately and all entered the Confederate Army under the leadership of one of their instructors, later to gain fame as "Stonewall" Jackson.

Splendid personal, mental, and physical endowments marked Colonel Harris early for leadership and his rise in the army was rapid. When the war ended, he had attained the rank of Colonel though only 24 years of age.

The war left the Harris fortune wrecked, so late in 1865 he came west. His personality, training, and experience secured for him employment as a civil engineer with the Kansas Pacific Railway (now the Union Pacific). His first assignment was to supervise construction of the Leavenworth to Lawrence branch.

This assignment was completed in 1866. Harris was then appointed resident engineer for the Kansas Pacific with headquarters in Wyandotte, Kan. (now Kansas City, Kan.). He remained until 1868 when he was appointed land agent for the Kansas Pacific and moved his headquarters to Lawrence, Kan.

Colonel Harris "had inherited love of country life and pastoral pursuits" and while on a Kansas Pacific right-of-way inspection trip, he was tremendously impressed with the lay of the land and apparent fertility of the Kansas river valley at a point some 25 miles west of Kansas City. He was completely captivated by the beauty of the landscape as viewed from a knoll about ½ mile north of the present town of Linwood, Kan. This knoll provided a view for considerable distance to the north, the east, and the south.

He walked over this area, noted its location in his memorandum book, and commented that some day he would build a home on that knoll. Approximately three years later a part of his dream became a reality, for one finds in the records that a deed dated June 9, 1868, transferred the ownership of the southwest quarter of Section 14 Township 12 Range 21 from Thomas L. Price to William A. Harris. The knoll where he hoped some day to build a home is located on this tract. Other land adjoining and nearby, making a total of 2946.47 acres, was included in this transaction.

Colonel Harris continued as land agent for the Kansas Pacific for several years but during this period, he also operated his farm at Linwood and developed quite a large herd of high grade beef cattle.

He resigned as land agent for the Kansas Pacific in 1876 so he could devote his entire attention to his farm and livestock but the house he had envisioned as a home was not completed until 1884 when the family moved from Lawrence to the new home. The Harris home, the most pretentious in the area, was usually referred to by persons of that community as "The Mansion," not in a spirit of derision but rather in one of community pride.

Built on the knoll as planned, the house has twelve spacious rooms, four large fireplaces each faced with beautiful imported tile and a most imposing carved walnut stairway leading to the second floor from a wide deep hall. The area around the house was beautifully landscaped