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Grazing & Feeding Trials With Corn and Soybeans for Pork Production

By

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SUMMARY

Satisfactory gains were made when grazing on the Mammoth Yellow beans alone.

Supplementing beans with corn increased the daily gains.

Supplementing beans with corn will enable earlier marketing which is generally more desirable.

The Mammoth Yellow bean was noted to be much more palatable than the Laredo.

When the pigs were supplied either Mammoth Yellow or Laredo beans with corn, sufficient amounts of the beans were consumed to aid materially in balancing the corn ration.

Larger daily gains were made when using the Mammoth Yellow bean for self-feeding and hogging down with corn than when using the Laredo in the same way.

The pigs made larger daily gains while hogging down corn and Mammoth Yellow beans than they did while being self-fed the same in dry lot; however, the reverse was true with corn and Laredo beans.

In the one test reported, in each lot the addition of a protein supplement to corn and beans increased the daily gains.

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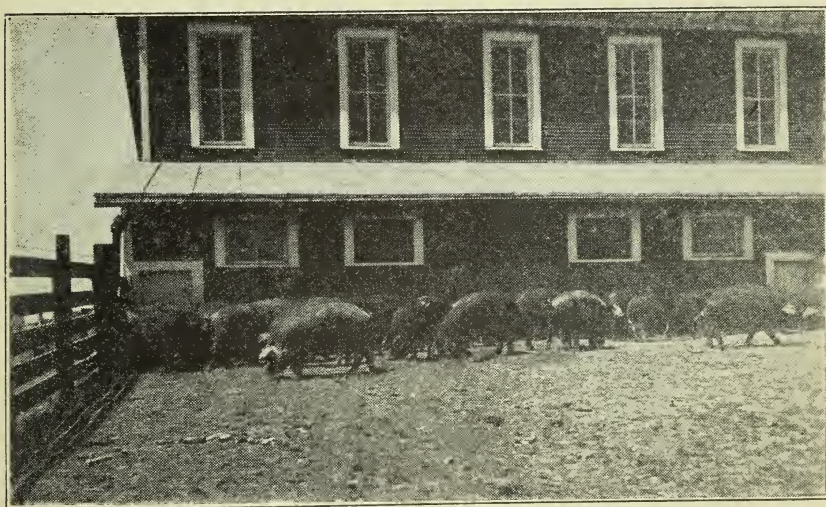
P. G. BEDENBAUGH*

INTRODUCTION

Realizing that the use of soybeans was rapidly increasing in the State, both as a soil improver and for the production of pork, experimental work was carried out at the Mississippi Experiment Station to try to determine the most desirable variety and economical way of utilizing the beans for the production of pork. Most of the trials conducted were with the Mammoth Yellow and Laredo beans, since they were two of the leading varieties being grown in the State.

PIGS USED AND PREVIOUS HANDLING

All pigs used in the following experiments were bred and raised on the Experiment Station farm and in each trial they had had the same care and feeding until the various trials were started. The practice was to worm and move the pigs on clean grazing lots as soon after weaning as possible. They were smooth, thrifty, and considered as good-to-choice feeder pigs. The breeding consisted of purebred Poland China, Duroc Jersey, and Hampshire, with some cross-breds of these breeds. At the beginning of each experiment, the pigs were divided into lots as nearly equal as possible in age, breeding, type, sex, quality, condition, and weight.



Type of Pigs Used in Feeding and Grazing Trials

*The work reported herein from 1923 to 1926, inclusive, was conducted under the supervision of Geo. S. Templeton.

SOYBEANS GRAZED ALONE AND WITH CORN—1923 AND 1924

The soybeans used in this test were the Mammoth Yellow variety. The beans were grown in the drill with corn in rows three and one-half feet apart. The corn was gathered the day before the test was started, care being taken to prevent any corn being left in the field. The estimated yield of beans per acre in the fall of 1923 was thirteen bushels.

The crop of 1924 was not planted until the first of May and there was very little rain from the latter part of May until the early part of November; consequently, the bean crop was very short. The ground was very dusty during the early part of the grazing period and the beans shattered out shortly after the hogs were turned on the bean field and they were forced to root the beans out of the dust. It will be noted that lower daily gains were made than in the previous year.

The following table gives a summary of the soybeans grown with corn, the corn gathered, and the beans grazed alone; also soybeans grazed plus two and one-half per cent corn hand fed daily. That is, the amount fed per day was two and one-half per cent of the live weight of the hogs in that lot.

Table 1.—Soybeans Grown with Corn, the Corn Gathered and the Beans Grazed; Also Beans Grazed, and Corn, Hand-Fed.

	1923		1924	
	Soybeans Grazed Alone	Soybeans Grazed plus 2½ per cent corn	Soybeans Grazed Alone	Soybeans Grazed plus 2½ per cent corn
Length of Trial.....	56	56	42	42
Number of Hogs Used	12	12	12	12
Average initial wt. (lbs.)	143	141	119	120
Average final wt. (lbs.)	206	232	155	184
Average daily gain per hog (lbs)	1.12	1.62	.86	1.53
Corn fed per cwt. of grain (lbs.)	—	287	—	250
Variety of beans grazed	Mammoth Yellow	Mammoth Yellow	Mammoth Yellow	Mammoth Yellow

Assuming that the equivalent in value of 500 pounds of corn is required to produce 100 pounds of gain, it will be noted in the above table that when the pigs were grazing on beans with 2½ per cent ration of corn hand-fed daily, the beans replaced 213 to 250 pounds of corn per hundred weight of gain. It will also be seen from Table 1 that in 1923, when the beans were plentiful, the daily gains were increased 44 per cent by adding corn. The following year when the beans were not so plentiful, adding corn increased the daily gain 78 per cent.

HOGGING DOWN CORN AND SOYBEANS—1926

In the fall of 1926, two groups of hogs were used to compare heavy and light weight hogs for hogging down corn and beans in order to make a study of the relative firmness of carcass as influenced by same. The soybean work was conducted cooperatively with the Bureau of Animal Industry, U. S. Department of Agriculture. Twenty head were spring farrowed pigs with an average initial weight of 127 pounds. Seventeen head were summer farrowed pigs with an average initial weight of 50 pounds.

The beans were grown together with corn in rows. By harvesting a

measured distance, consisting of several rows, an estimate of the crop yield was secured. The yield of corn grown with the Mammoth Yellow beans was estimated to be 44.7 bushels per acre and the yield of beans was 6.2 bushels per acre. The corn and beans were mature at the time the hogs were turned into the field. The hogs preferred the Mammoth Yellow beans and did not consume very much corn as long as the beans were plentiful. When the beans became scarce so that the hogs had to exert themselves to gather them, they consumed mostly corn.

Lot 1, consisting of 10 heavy weight hogs, was on corn and Mammoth Yellow beans for a period of eight weeks. A second lot of 10 heavy weight hogs was on corn and Mammoth Yellow beans for four weeks.

Lot 3, consisting of 10 light weight pigs, grazed on corn and Mammoth Yellow beans for 56 days. Seven light weight pigs in Lot 4 grazed on corn and Mammoth Yellow beans for 28 days.

Each lot of pigs had free access to a mineral mixture composed of ten parts acid phosphate, ten parts air slaked lime, and two parts salt. The results are given in the following table:

Table 2.—Hogging Down Corn and Soybeans—1926

Lot.....	1	2	3	4
Number of days grazed.....	56	28	56	28
Number of hogs used.....	10	10	10	7
Average initial weight (lbs.).....	130	124.1	49.3	51.3
Average final weight (lbs.).....	206.9	170.4	104.2	75.4
Average daily gain per pig (lbs.).....	1.37	1.65	.98	.86
Variety of beans grazed.....	Mammoth Yellow	Mammoth Yellow	Mammoth Yellow	Mammoth Yellow

It will be noted in the above table that in each instance the heavy weight pigs made the larger daily gains as was to be expected.

HOGGING DOWN CORN AND SOYBEANS—1927 AND 1928

Heavy and light weight pigs were used to make a weight study as well as to compare the palatability of Mammoth Yellow and Laredo beans.

The heavy weight pigs were divided into two lots, one grazing corn and Mammoth Yellow beans for six weeks, and the second lot on corn and Laredo beans for six weeks. The light weight pigs were likewise divided into two lots. One lot was turned on corn and Mammoth Yellow beans for eight weeks and the second lot grazed on corn and Laredo beans for eight weeks.

The yield of Mammoth Yellow beans grown with corn was estimated to be 5.1 bushels per acre and the estimated yield of Laredo beans grown with corn was 6.3 bushels per acre. This estimate was made by harvesting a small area of representative ground. The corn and beans were mature at the time the pigs were turned into the field. The hogs did not start breaking down the corn in the Mammoth Yellow bean field for several days. After going into the field and breaking down corn around the shade which was provided for them, it was noticed that the pigs continued to graze on Yellow beans for several days in preference to the corn which they had to pass over to get to the beans. However, during this time in the Laredo soybean field the pigs had broken down and consumed a considerable amount of corn.

The work of 1928 was a continuation of the variety study of Mammoth Yellow and Laredo beans. Two lots of twelve pigs each were used. One lot hogged down corn and Mammoth Yellow beans and the second lot hogged down corn and Laredo beans.

The corn and beans were grown together in the same row as usual and the crop was mature when the hogs were turned into the fields. No estimate of the crop yield was made however, it being apparently about the same yield as that of 1927. The relative palatability of the beans was noted to be about the same as during 1927.

MINERAL MIXTURE

Each lot of pigs, 1927 and 1928, had free access to a mineral mixture. However, no record was kept as to the amount consumed. The mineral mixture was as follows:

10 pounds acid phosphate; 10 pounds air slaked lime; 2 pounds salt.

The following table gives results of the two years' work:

Table 3.—Hogging Down Corn and Soybeans—1927 and 1928

Lot.....	1	2	3	4	5	6
Year	1927	1927	1927	1927	1928	1928
Number of days grazed.....	42	42	56	56	59	59
Number of hogs used.....	14	14	15	15	12	12
Avg. initial wt. (lbs.).....	126.9	127	98.3	98	101.75	96.41
Avg. final wt. (lbs.).....	230.85	220.92	194.2	186.8	206.75	175.60
Avg. daily gain per pig (lbs.)..	2.47	2.23	1.71	1.58	1.77	1.34
Variety of beans grazed.....	Mammoth Yellow	Laredo	Mammoth Yellow	Laredo	Mammoth Yellow	Laredo

Lots 1 and 2, also Lots 3 and 4 are comparable in every respect except hogging down a different variety of beans with corn. In each instance, higher daily gains were made on the Mammoth Yellow beans.

It will also be noted from the above table that in 1928 the hogs made larger daily gains on the Mammoth Yellow beans.

SELF-FEEDING SHELLED CORN AND SOYBEANS FREE CHOICE AND HOGGING DOWN CORN AND SOYBEANS—1928

This year's work consisted of self-feeding shelled corn, whole soybeans and mineral mixture free choice in dry lot to compare the palatability of varieties and the relative effects of the beans on the gains of hogs. The work also included hogging down corn and soybeans with mineral mixture, using some of the same varieties of beans as were used in dry lot feeding to get a relative comparison of gains when hogging down versus self-feeding in dry lot.

They were fed as follows:

- Lot 1. Check lot, self-fed shelled corn and tankage, free choice.
- Lot 2. Self-fed shelled corn and Mammoth Yellow soybeans, free choice.
- Lot 3. Self-fed shelled corn and Laredo soybeans, free choice.
- Lot 4. Self-fed shelled corn and Manchu soybeans, free choice.
- Lot 5. Self-fed shelled corn, Laredo and Mammoth Yellow soybeans, free choice.
- Lot 6. Hogging down corn and Mammoth Yellow soybeans.
- Lot 7. Hogging down corn and Laredo soybeans.

Lots 1, 2, 3, 4, and 5 were fed in dry lots. All lots had free access to

a mineral mixture. No record was kept as to the amount of mineral mixture consumed. The mixture was composed of:

10 pounds acid phosphate; 10 pounds air slaked lime; 2 pounds salt.

Table IV.—Self-feeding Shelled Corn and Soybeans, Free Choice, and Hogging Down Corn and Soybeans. September 30 to November 27, 1928—59 Days.

	1	2	3	4	5	6	7
Method of feeding	Dry lot	Dry lot	Dry lot	Dry lot	Dry lot	Hogging Down	Hogging Down
Kind of ration	Corn and Tankage	Corn and M. Yellow beans	Corn and Laredo beans	Corn and Manchu beans	Corn, Laredo & M. Yel. beans	Corn and M. Yellow beans	Corn and Laredo beans
Number of hogs	8	8	8	7	7	12	12
Age initial wt. (lbs.)	101.87	101.25	101.75	101.14	102.57	101.75	96.41
Age final wt. (lbs.)	217.62	187.25	186.37	175.00	177.57	206.75	175.60
Age daily gain (lbs.)	1.96	1.45	1.43	1.25	1.27	1.77	1.34
Consumed per 100 lbs. gain:							
Corn	311.77	229.65	271.93	315.08	277.33	—	—
Tankage (lbs.)	37.68	—	—	—	—	—	—
Mammoth Yellow beans (lbs.)	—	112.50	—	—	104.57	—	—
Laredo Yellow beans (lbs.)	—	—	87.00	—	*0.0	—	—
Manchu Yellow beans (lbs.)	—	—	—	52.22	—	—	—
Portion of corn to tankage	8.26:1	—	—	—	—	—	—
Portion of corn to soybeans	—	2.04:1	3.12:1	6.03:1	2.74:1	—	—

*Only one pound of Laredo soybeans was consumed during the feeding test.

It is noted in this one test that when the soybeans were self-fed, the pigs relished them in the following order:

Mammoth Yellow, first
Laredo, second
Manchu, third.

Evidently the Laredo is not nearly so palatable as the Mammoth Yellow as is noted in Lot 5 where the pigs had free choice of the two varieties, they did not consume any of the Laredo beans.

It will be noted from the above table that the pigs in Lot 6, hogging down corn and Mammoth Yellow soybeans, gained more rapidly than the pigs in Lot 2, which were being self-fed the same variety of beans and corn.

By referring to Lots 3 and 7 it will be noted that larger daily gains were made when self-feeding corn and Laredo soybeans in dry lots than when hogging down same.

SELF-FEEDING GROUND CORN AND SOYBEANS AND THE FEEDING OF SAME WITH DIFFERENT PROTEIN SUPPLEMENTS—1929

In soft pork studies large variations have occurred in carcasses of hogs from the same lot; therefore, it was deemed necessary to know the exact proportion of corn to beans each individual pig consumed in order to try to determine the cause of variation in firmness of carcasses, and the only way to obtain such information necessitated the grinding and thorough mixing of the feeds in known proportions. Hence, this year's work was carried out on that basis.

This year's work consisted of the addition of a protein supplement to

the corn and soybean ration in order to see if same was profitable and if so, what source of protein supplement would give the most economical gains. All feeds were ground and mixed thoroughly in definite proportions. Each group of pigs was self-fed in dry lots and had free access to the following mineral mixture:

10 parts bone meal; 10 parts ground limestone; 2 parts salt.

They were fed as follows:

Lot 1. Corn, 6 parts and Mammoth Yellow soybeans, one part.

Lot 2. Corn, 6 parts and Virginia soybeans, 1 part.

Lot 3. Corn, 6 parts and Mammoth Yellow soybeans, 1 part plus 2 per cent protein by the addition of Marine Protein feed.

Lot 4. Corn, 6 parts and Mammoth Yellow soybeans, 1 part plus 2 per cent protein by the addition of dried buttermilk.

Lot 5. Corn, 6 parts and Mammoth Yellow soybeans, 1 part plus 2 per cent protein by the addition of cotton seed meal.

The results are given in the following table:

Table 5.—Self-Feeding Ground Corn and Soybeans and the Feeding of Same With Different Protein Supplements

Lot	1	2	3	4	5
Ration (Self-fed in dry lot)	Corn 6 parts Mammoth Yellow Beans 1 part	Corn 6 parts Virginia Beans 1 part	Corn 6 parts Mammoth Yellow Beans 1 part, M. P. F. 0.3 part	Corn 6 parts Mammoth Yellow Beans 1 part D. B. M. 0.4 part	Corn 6 parts Mammoth Yellow Beans 1 part, C. S. Meal 0.341 part
Number of hogs	10	10	10	10	10
Length of feeding trial (days)	63	63	56	56	56
Avg. initial wt. (lbs.)	96.8	96.5	99	99.1	98.7
Avg. final wt. (lbs.)	190.3	196.2	207.1	224.1	202.2
Avg. daily gain per hog (lbs.)	1.48	1.58	1.98	2.23	1.84
Feed consumed per 100 lbs. gain:					
Corn (lbs.)	325.72	322.00	282.24	269.42	292.10
Beans (lbs.)	54.28	46.00	47.03	44.90	48.68
Protein Supplement (lbs.)	—	—	14.10	17.96	16.63
Mineral Mixture (lbs.)	7.59	5.71	2.40	1.36	2.41

By referring to the above table, the following will be noted:

Lot 1, receiving Mammoth Yellow soybeans with corn, made an average daily gain of 1.48 pounds, requiring 380 pounds of concentrates to make 100 pounds of gain.

Lot 2, receiving Virginia soybeans, made a daily gain of 1.58 pounds per head, requiring 368 pounds of concentrates per 100 pounds of gain. The Virginia bean lot consumed 12 pounds less feed to make 100 pounds of gain and at the same time produced gains more rapidly.

As a protein supplement for increasing daily gains, the three supplements used in this test ranked as follows:

Dried Buttermilk
Marine Protein Feed
Cottonseed Meal