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Feeds Supplementary to Corn For Southern Pork Production

BY

DAN T. GRAY, J. F. DUGGAR, J. W. RIDEGWAY

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FEEDS SUPPLEMENTARY TO CORN FOR SOUTHERN PORK PRODUCTION.

By

D. T. GRAY, J. F. DUGGAR, J. W. RIDGEWAY.

SUMMARY.

1. This bulletin records a summary of three years' work in swine production, in which 90 hogs have been used.

2. The object in presenting this bulletin is to get together the three years' work so as to make a comparison between finishing hogs upon corn alone and finishing them upon corn supplemented with either green crops or concentrates.

3. When corn was used alone as a ration for fattening hogs both the daily gains and the financial outcome were unsatisfactory. Money was lost in every case where corn was fed without a supplement.

4. When corn was supplemented with a partial ration of cotton seed meal the daily gains and the financial outcome were satisfactory. Four deaths occurred as a result of the use of cotton seed meal, *but these deaths did not occur while the animals were eating the meal. All of the deaths have occurred soon after the animals were taken off of cotton seed meal and placed upon a ration which contained no cotton seed meal.* This suggests the idea that cotton seed meal may be stimulating in its effects—similiar to the action of certain drugs—and when it is removed suddenly from the animals that death may occur through depression.

5. Tankage, a packing house by-product, proved to be an exceedingly satisfactory feed to supplement corn. In fact, it was almost as satisfactory as cotton seed meal, and it has the advantage over cotton seed meal in that there is no danger in feeding it.

6. When corn was supplemented with a ration of one-half cowpeas (the seed) the results were more satisfactory than when corn was used alone, valuing the cowpeas at

80 cents per bushel. The peas were used profitably until they reached a price of $1.05 per bushel.

7. As a whole, peanut pasture was found to be more useful than any other pasture tried. Notwithstanding the fact that the peanut pastures were not good two years out of the three they still gave excellent results. Pork was made at a good profit when peanut pasture was used in conjunction with corn.

8. Mature sorghum pasture has very little to recommend it as a feed for fattening swine. Both the gains and the financial outcome were unsatisfactory.

When the sorghum was cut and carried to the hogs the results were better than when the hogs were made to graze the crop.

9. The expense of extracting the juice from the sorghum and feeding the juice only prohibits its use in this way, although excellent daily gains were made. In no case was the juice found to be worth more than 1.8 cents a gallon as a feed for hogs.

10. Soy bean pasture ranked second to peanut pasture as a supplement to corn.

11. Chufa pasture was not found to be as good as either peanuts or soy bean pasture.

12. The average daily gains were as follows: corn alone, .69 of a pound; corn 2–3 of the ration plus cotton seed meal 1-3, 1.04 pounds; corn 9-10 plus tankage 1-10, 1.04 pounds; corn 1–2 plus cowpeas 1–2, .94 pounds: corn plus peanut pasture, 1.01 pounds; corn plus sorghum pasture, .37 pound; corn 2–3 plus cotton seed meal 1–3 plus peanut pasture, 1.00 pound; corn 2–3 plus cotton seed meal 1–3 plus sorghum pasture, .46 of a pound; corn plus chufa pasture, .72 of a pound; corn plus soy bean pasture, 1.02 pounds; corn 2–3 plus cotton seed meal 1–3 plus soiled (cut sorghum), .75 of a pound.

13. The cost of one hundred pounds gain in each case, when the cost of putting in and cultivating the pasture crops was not taken into consideration, was as follows: corn alone, $7.63; corn 2-3 plus cotton seed meal 1-3, $5.75;

corn 9–10 plus tankage 1–10, $5.18; corn 1–2 plus cowpeas 1-2, $5.11; corn plus peanut pasture, $2.28; corn plus sorghum pasture, $5.46, corn 2–3 plus cotton seed meal 1–3 plus peanut pasture, $1.97; corn 2–3 plus cotton seed meal 1–3 plus sorghum pasture, $4.85; corn plus chufa pasture, $3.81; corn plus soy bean pasture, $1.96; corn 2–3 and cotton seed meal 1–3 plus soiled sorghum, $3.39.

14. The cost of one hundred pounds gain in each case, when the cost of putting in and cultivating the pasture crops was counted against the gains, was as follows: corn alone, $7.63; corn 2-3 plus cotton seed meal 1-3, $5.75; corn 9–10 plus tankage 1–10, $5.18; corn 1–2 plus cowpeas 1-2, $5.11; corn plus peanut pasture, $3.20; corn plus sorghum pasture, $11.90; corn 2–3 plus cotton seed meal 1–3 plus peanut pasture, $2.14; corn 2–3 plus cotton seed meal 1–3 plus sorghum pasture, $7.79; corn plus chufa pasture, $8.89; corn plus soy bean pasture, $2.74; corn 2–3 plus cotton seed meal 1–3 plus soiled sorghum, $4.86.

15. When hogs have been grazing a green crop it usually pays to inclose and feed them in a dry lot for a short period after the crop is exhausted.

16. When corn was fed alone but 48 cents was realized upon each bushel of corn used. The way to secure a better price for the corn is to feed it in combination with some other feed.

17. When hogs sell for from 5 to 7 cents a pound live weight the farmer cannot afford to sell his corn for 70 cents a bushel.

INTRODUCTORY.

While Alabama produces a portion of the pork that her people consume she falls far short of meeting home demands. Much of the pork we use is made in Illinois, Iowa, Ohio, and other northern states. It costs the farmer as much, and perhaps more, in those states to produce a pound of pork than the same pound would cost if produced by the Alabama farmer; under present conditions our people pay those northern farmers a good profit upon their pork-making operations and in addition, pay heavy freight

rates to get the meat transferred to the South. It is no uncommon sight to see the Alabama farmer hauling to his country home meat killed in Chicago. This meat costs from 10 to 12.5 cents at present prices—and it is a cheap quality of meat at that. The Alabama farmer could have made that pork upon his own farm for about one-half the above expense, and by the judicious use of supplementary feeds, could have the meat for at least one-third of what he must pay for it at the grocer's store. Besides getting the meat cheaper, thus saving his money, he would have upon his table first class hams, ribs, and chops instead of the poorer quality of side meat.

Object of Experiments.

These experiments were planned with a three-fold object in view:

1. To compare finishing hogs upon corn alone (the usual method followed in the South) with finishing them upon corn supplemented in some cases with a concentrated feed and in some cases with green crops.

2. To study the efficiency of different feeds, or combinations of feeds, in hardening the flesh of hogs after it has been rendered soft as a result of the animals grazing peanuts.

3. To study the effect of different feeds—with special reference to cotton seed meal—upon the strength, chemical composition, and histology of the bones.

The first object only is dealt with in this bulletin. The other two will receive consideration in a later report.

Animals Used.

This report is based upon three years' experimentation and can be considered only as a report of the progress of the work. Ninety hogs have been used during these three years, divided into numerous lots—six lots each year. While definite conclusions could not be drawn from the data collected through the use of so few animals in a single year's work, yet the test has been repeated in many respects the third year, so the conclusion drawn can be

regarded as fairly accurate and trustworthy. The hogs used, while perhaps somewhat better in quality than the average hogs of the state, can be considered about equal to the animals which our best farmers keep upon their farms. They were picked up from neighboring farmers around Auburn, and all of the animals had some improved blood in them. This improved blood consisted largely of Poland-China or Berkshire blood; there were also a few Yorkshire grades. A few of the animals showed close kinship to the "razor backs." At the beginning of the test they averaged something like seventy pounds in weight, and probably averaged five months in age.

Quarters.

The pigs which were fed upon concentrates only were confined in dry lots which had a good open shed across one end which afforded them protection from both the hot sun and the cold rains. These lots were about 30 by 100 feet in size. The hogs which were running upon a pasture crop were confined upon these crops by means of a moveable fence (or hurdles); these lots were also afforded shelter from the hot sun by means of trees and bushes or by artificial structures. All the pigs in all cases were made comfortable. When the pigs were grazing a green crop, in some cases they were given the run of but a small area at a time, and the hurdles were then moved forward on a new area, but in other instances the whole area was fenced in and the animals given the privilege of running upon the whole area at one time. There is perhaps a smaller waste when but a small area is grazed at a time, but the labor in moving the fence is not inconsiderable if the areas are made too small.

Division Into Lots.

Each year when the pigs were brought to the Animal Industry farm the whole lot was put under similiar conditions a sufficient length of time to establish uniformity, after which time, they were carefully divided into six lots as nearly equal as possible in quality, age, size, weight, sex

and breed with previous condition and raising taken into consideration.

FEEDING.

All of the lots were fed twice daily throughout the entire tests, as nearly as possible at the same hour each day, so as to avoid producing restlessness among the pigs. With the exception of the year 1905–'06 the corn was ground and fed in a slop. When the corn was fed with other concentrates the two were always mixed together and fed as a slop. During the years 1905–'06 and 1906–'07 the cotton seed meal was always fermented, or soured, twenty-four hours before feeding, but during the last year, 1907-'08, it was taken directly from the sacks, mixed with the corn meal, and given to the hogs. Those rations which contained cotton seed meal were fed in a very thin slop—in fact so thin that the animals could drink the feed rather than eat it. It was soon learned that when the cotton seed meal was fed in an exceedingly thin slop that the pigs always maintained a keen appetite for the feed, no matter how long they were kept on the feed, but when the ration was placed before them in a dough state it would be but a few days until the whole pen would "go off feed".

All green crops used by the hogs were gathered by the hogs themselves, except in one case in 1905–'06 where sorghum was cut and carried to one lot confined in a pen in order that a comparison might be made with sorghum grazed and sorghum fed in a dry lot (soiled).

All the lots at all times had a mixture, consisting of salt, coal and lime, before them. It was very noticeable that those pigs upon corn alone ate much more of this mixture than did the other lots.

The quantity of food given those pigs which were confined in the lots was gauged by their appetites, the object being to give each lot all it would eat up clean and still retain the appetite. The lots which received a green ration in addition to the grain were not given a full grain ration. Such lots received a grain ration equal to two per cent of the total live weight of the lot; for instance, if

a certain lot weighed 800 pounds the daily grain ration would have been 16 pounds. Thus the lots on pasture crops received what may be considered about half a full ration of concentrated food.

The Pasture Crops.

The sorghum crops were as good each year as they could be expected to be when grown upon poor sandy soils. The sorghum was grown in drills and cultivated. The yields, green weight, averaged about eight tons to the acre. The hogs were turned upon the pasture just about the time the juice began to sweeten—or about the time the heads began to turn black, when the sorghum plants were usually 5 or 6 feet high. It was hard work for the hogs to graze the sorghum as the juice was secured so slowly by them that they were never satisfied; so they put in pratically all their time riding down the stalks and chewing the cane; this is not conducive to rapid and economical gains. The peanut crops were not as good as the sorghum crops. In 1905–'06 there was practically a full stand and yield of peanuts. In 1906-'07 there was a very poor stand and not more than a 40 percent yield. In 1907–'08 the yield and stands were even poorer than the previous year. The poor stands and yields were largely due to the fact that labor could not be secured to work the crops after they were put in.

The chufa crop was an average crop, and the soy bean stand was not far below the average, but the yield was cut down somewhat on account of the extremely dry weather just at the time the beans were maturing, so that they finally yielded about 70 per cent of a normal crop. The hogs were turned upon the soy beans two weeks before the beans were matured enough to be eaten, so for the first two weeks the animals ate nothing but the leaves in addition to the corn they received; the records show that the animals made satisfactory gains even these first two weeks.

Periods.

Each year's work was divided into periods because the

nature of the work required that it be thus divided, as one of the main points was to study the effect which different feeds might have upon the melting point of the lard when following other feeds, as peanuts. The first year's test, 1905–'06, was divided into two periods. The two following years' work were divided into three periods each. Each period varied in length from twenty–eight to fifty days, thus making each full experiment from ninety to one hundred and ten days in length.

Slaughter Data.

At the end of each period one animal from each lot was slaughtered and careful notes collected upon the dressed weights, appearance of the carcasses, the rapidity and the extent of the "setting", the appearance and weights of the internal organs, etc. Samples of fat were taken from each carcass and turned over to the chemist, Professor Hare, who made melting point determinations, and further studies to learn the effect of different feeds upon the fat of swine. The fifth, six, and seventh ribs were also taken from each animal slaughtered with a view to making a chemical and histological study of the effect of the various feeds upon the animal frame work.

Sales.

The animals were all sold to either the Auburn or Opelika butchers at five cents per pound live weight. If they could have been placed upon the Montgomery or New Orleans market they would have brought from six to seven and one–half cents per pound live weight. The majority of the pigs at the beginning of the test were purchased at a cost of five cents per pound, so under local conditions there was no margin of profit between the buying and the selling prices.

Values Placed Upon Feeds.

In working out the financial statement which follows, the following values were placed upon the feeds:

Corn ..... 70 cts. per bushel,
Cowpeas ..... 80 cts. per bushel,
Cotton Seed Meal ..... 25 dollars per ton,
Tankage ..... 40 dollars per ton.

As a rule there has been no expense charged against the gains made by the hogs as a result of putting in and working the green crops. This varies so much in different localities that figures would be of very little value. But to give an approximation of what it would cost to make a pound of pork when the crops are charged against the animals the cost has been worked out for the conditions existing here upon the station farm (see table 17 page 61). It has been considered, in this bulletin, that the cost of putting in and cultivating the crop was offset by the good done the soil by having the pigs graze over it and drop the manure. This is not merely an assumption; it has been experimentally proven that where hogs on a partial ration of concentrates have been permitted to graze over an acre of green crops, that the increase yield in the cotton crop following the next year alone was 195 pounds of seed cotton, and the second year's increase, due to the grazing two years before, was 183 pounds of seed cotton.

Discussion of the Experiment.

The feeding tests here reported were conducted at different times throughout the year 1905–'06, 1906–'07, 1907–'08. With the exception of the first year the general plan was to begin the work in August or the first part of September and carry some of the lots from 35 to 50 days upon various concentrated feeds and the other lots on sorghum, as sorghum comes on earlier in the summer than do the peanuts. During the year 1907-'08 both soy beans and sorghum were used as green crops during the first period. After the first period the peanuts were ready to use and the lots were transferred from the sorghum and the soy bean pastures to the peanut pasture. The peanut pasture was exhausted in from 28 to 35 days, after which time the lots were all brought in and fed in dry lots upon concentrates only, for a finishing period of 28 days. The following tabulated statement displays the plan of the work:

TABLE 1. *General Outline of the Experiments.*

1905–6

No. Lot	RATION AND DATE		
	Period 1,	Period 2 (60 days) Sept. 21–Nov. 10	Period 3 (35 days) Nov. 10–Dec. 15
1		Peanut pasture Corn	Corn only
2		Peanut pasture Corn	Corn 2-3 C. S. Meal 1-3
3		Peanut pasture Corn 2-3 C. S. Meal 1-3	Corn 2-3 C. S. Meal 1-3
4		Sorghum juice Cowpeas 2-3 Corn 1-3	Sorghum Juice Cowpeas 1-3 Corn 2-3
5		Cowpeas 2-3 Corn 1-3	Cowpeas 1-3 Corn 2-3
6		Corn only	Corn only

1906–7

	Period 1 (49 days) Aug. 8–Sept 26	Period 2 (28 days) Sept. 26–Oct. 24	Period 3 (35 days) Oct. 24–Nov. 28
1	Cut sorghum Corn 2-3 C. S. Meal 1-3	Peanut pasture, Corn	Corn only
2	Grazed sorghum Corn 2-3 C. S. Meal 1-3	" " "	Corn 2-3 C. S. Meal 1-3
3	Corn 2-3 C. S. Meal 1-3	" " "	Corn 2-3 C. S. Meal 1-3
4	Sorghum juice Corn 2-3 C. S. Meal 1-3	Chufa pasture Corn	Japan cane Corn 2-3 C. S. Meal 1-3
5	Corn 2-3 C. S. Meal 1-3	Corn 2-3 C. S. Meal 1-3	Corn 2-3 C. S. Meal 1-3
6	Corn only	Corn only	Corn only

1907–8

	Period 1 (35 days) Sept 6–Oct. 11	Period 2 (28 days) Oct. 11–Nov. 8	Period 3 (28 days) Nov. 8–Dec. 6
1	Soy bean pasture Corn	Peanut pasture, corn Corn	Corn 2-3 Tankage 1-3
2	Grazed sorghum Corn 2-3 C. S. Meal 1-3	" " "	Corn 2-3 C. S. Meal 1-3
3	Grazed sorghum Corn	" " "	Corn
4	Corn 9-10 Tankage 1-10	Corn 9-10 Tankage 1-10	Corn 9-10 Tankage 1-10
5	Corn 2-3 C. S. Meal 1-3	Corn 2-3 C. S. Meal 1-3	Corn 2-3 C. S. Meal 1-3
6	Corn only	Corn only	Corn only

PEANUT PASTURE TO SUPPLEMENT CORN.

In all cases where peanuts were used the hogs were grazed upon them, thus saving the expense of having them harvested. This method of harvesting a crop has the additional advantage of having the manure scattered upon the cultivated fields just where wanted without the expense of hauling it with wagon and team. The data in this bulletin covers three years' work with peanuts but the first year's work is the only one during which time there was an average crops of nuts, as noted elsewhere; the crops of both the years 1906-'07 and 1907-'08 were very poor ones due to the fact that labor could not be secured to work them.

TABLE 2. *Summary of the three years' work with Peanuts.*

Ration	No. Animals Used	Average Daily Gains	Initial weight of pigs	Grain required for 100 lbs. gain	Cost of grain for 100 lbs. gain
		Lbs.		*Lbs.*	
Corn alone	15	.69	73	611	$7.43
Corn				148 Corn	
Peanut pasture....	32	1.01	81	.45 acre peanuts	1.85

This table, while illustrating the great use to which peanut pasture can be put in saving corn, does not deal fairly with the nuts as far as the area which is required to produce 100 pounds is concerned; as noted above, the nuts were not a full crop two of the years. Usually the area required to produce 100 pounds gain will be cut down very materally from that shown in the above table, as may be seen in a following table, in which case the peanuts were practically a full crop—or an average crop. Even though in two years out of the three there were poor stands, still the nuts made a good showing. The table indicates that .45 of an acre of peanuts was equal in feeding value to 463 pounds of corn, and that the cost of concentrates

required in making 100 pounds gain was reduced from $7.63 in the case of corn alone to $1.85 when the corn was supplemented with peanuts. In this table there has been no expense counted against the animals as a result of putting in and cultivating the green crops, as it has been experimentally proven that when a leguminous crop, like peanuts, is grown and grazed off by pigs, that the increased fertility, as measured by the succeeding year's crop of cotton, has sometimes more than paid for the expense of putting in the crop. (See page 74).

Money was lost in the case where corn alone was fed to pigs, the gains costing $7.63 per 100 pounds and could be sold for but $5.00 per 100 pounds at Auburn. Seventy cent corn calls for seven-cent hogs, live weight, if the feeder expects to come out even and realize 70 cents a bushel for corn.

The daily gains were much more satisfactory where the peanuts were grazed than when corn alone was fed. Hogs are never satisfied when fed corn alone. Corn alone does not meet the body requirements; it is lacking in protein and ash, so that when a young animal is compelled to eat corn alone he soon fails to make satisfactory gains, becomes restless, and puts in much of his time in rooting about the pen and trying to get out. A peanut-fed hog is always contented, as this feed meets the body requirements and he spends his spare time sleeping.

Bone samples have been saved from all of the animals and casual observation shows the bones of hogs which have been fed on corn alone to be much weaker and smaller than in the case where the corn was supplemented with other feeds.

During the year 1905-'06, in addition to having a peanut lot upon corn alone, there was another peanut lot which received, in addition to the peanut pasture, a two per-cent ration of corn and cotton seed meal, in the proportion of two-thirds corn and one-third cotton seed meal.

TABLE 3. *Corn versus Corn and Peanuts, versus Corn 2–3. plus Cotton Seed Meal 1–3.*

Ration	No. Animals used	Average Daily Gains	Initial weight of pigs	Feed required per 100 lbs. gain	Cost of grain for 100 lbs. gain
		Lbs.	*Lbs.*	*Lbs.*	
Corn alone.....	4	.67	65	560	$7.00
Corn				177 Corn	
Peanut pasture....	8	.91	60	.12 acres peanuts	2.22
Corn 2-3, ...				107 Corn	
C. S. Meal 1-3.....	4	1.00		51 C. S. Meal	
Peanut pasture....			59	.08 acre peanuts	1.97

This is the year's work when there was a normal crop of peanuts and represents more accurately what can be expected from the use of peanuts than does the preceding table. All of the lots, even the corn lots, made very satisfactory gains for such small animals. The lot upon peanuts, with corn alone added, made 35.8 per cent better gains than did the lot upon corn alone, and when both corn and cotton seed meal were added to the peanuts the gains were 47.7 per cent better than that of the corn lot. The daily gains were increased by 35.8 and 47.7 per-cent respectively through the addition of peanut pasture or of peanut pasture and cotton seed meal to corn alone and at the same time the cost of producing 100 pounds of pork was decreased from $7.00 in the case of corn alone to $2.22 when corn and peanut pasture were used, and to $1.97 when both corn and cotton seed meal were used in connection with the peanut pasture.

This table also illustrates the fact that when corn is worth 70 cents per bushel a farmer must secure 7 cents per pound, live weight, for his hogs if he expects to come out even when corn alone is fed.

When some cotton seed meal was added to the corn rations of the hogs when running on peanuts, the daily

gains were increased and the cost of one hundred gain was reduced from $2.22 to $1.97. No ill results followed the use of the cotton seed meal, but that is not a guarantee that evil results will never follow its use.

Tankage can be used to take the place of cotton seed meal when the farmer is afraid of losses from the use of cotton seed meal (as will be seen later), but tankage was found to be somewhat inferior to cotton seed meal for pork production.

Where corn alone was fed in addition to peanut pasture it was found that .12 of an acre of peanuts took the place of 382.5 pounds of corn, or one acre of peanuts was equal in feeding value to 56.9 bushels of corn. When both corn and cotton seed meal were fed in addition to peanut pasture one acre of peanuts was still more valuable than when corn alone was used. If the land upon which these peanuts were grown had been planted in corn instead of in peanuts it would have perhaps produced only fifteen to eighteen bushels of corn to the acre.

Sorghum.

Sorghum is a green crop well thought of in the South as a food for swine. Its chief advantage lies in the large yields and sureness, there being very few seasons in which it fails. But it must be remembered in planning a rotation of crops that sorghum is not a legume, and that the land will not be made better on account of its having been grown. Other things being equal, a leguminous crop should generally be grown for a hog feed, on account of its beneficial effects upon the soil. This bulletin comprises two years' work with sorghum. In some cases the grain fed in connection with the sorghum consisted of corn alone, in other cases of a ration made up of corn two-thirds and cotton seed meal one-third. Only a half grain ration was fed.

In all cases the hogs were not turned into the sorghum field until the juice began to sweeten, or until some of the heads began to turn black.

A test was also made to determine whether it would be

profitable to cut the sorghum in the fields and carry it to the hogs when confined in pens.

TABLE 4. *Corn alone versus Corn and grazed Sorghum; Corn alone versus Corn 2–3 Cotton Seed Meal, 1–3 and grazed Sorghum*

Ration	No. Animals used	Average Daily Gains	Initial weight of pigs	Feed required for 100 lbs. gain	Cost of grain per 100 lbs. gain
		Lbs.	*Lbs.*	*Lbs.*	
Corn alone.....	6	.78	73	456	$5.70
Corn				437 Corn	
Grazed sorghum	6	.37	73	.57 acre sorghum	5.46
Corn 2-3				206 Corn	
C. S. Meal 1-3 ..				103 C. S. Meal	
Grazed sorghum	6	.51	74	.37 acre sorghum	3.86

While the pigs which were confined in dry lots and fed corn alone made much better gains than can usually be expected from the use of corn alone, those animals which received the half ration of corn plus sorghum pasture, made a very poor showing, the daily gain being but .37 of a pound per pig. Another lot of pigs, not mentioned in table 4, but treated similarly to the sorghum lot, with the exception that they had soy beans in the place of sorghum, made an average daily gain of 1.02 pounds.

In the case above it is seen that .57 of an acre of sorghum took the place of but 19 pounds of corn, which means that one acre of sorghum saved but 32 pounds of corn when the sorghum was supplemented by corn alone.

A feed consisting of corn and sorghum alone is a very poor feed for either fattening hogs, or for producing growth. Both are low in protein and ash and high in carbohydrates, neither feed furnishing enough protein or ash for hogs which are not completely matured before the finishing period begins. The sorghum might have made a

better showing if the pigs used had been matured animals before the fattening period began.

When the ration of corn and sorghum was supplemented with a little cotton seed meal, as was the case with lot 3, the results were more satisfactory, but even with the use of cotton seed meal the results do not compare favorably with the results gotten from the use of either peanut or soy bean pasture as a supplement to corn. With the use of both corn and cotton seed meal 309 pounds of concentrates were required to make 100 pounds of gain, at a cost of $3.86. Data will be presented later on in the bulletin showing .37 of an acre of sorghum in lot three saved grain to the value of only $.56, or an acre of sorghum saved, in terms of concentrates, but $1.57.

In view of the fact that it is very hard work for pigs to graze sorghum, as the cane must be ridden down, and as it requires all of the hog's time—and more, too—to satisfy his appetite, since the juice is secured very slowly, it was thought that it might be profitable to place the hogs in a pen and carry the sorghum to them (soiling). Accordingly this test was tried in 1906-'07 with the following results:

TABLE 5. *Grazing Sorghum versus soiling Sorghum.*

Ration	No. Animals used	Average Daily Gains	Average Initial weight of pigs	Feed required per 100 lbs. gain	Cost of concentrates per 100 lbs gain
		Lbs.	*Lbs.*	*Lbs.*	
Corn 2-3	5	1.18	85	212 Corn	$3.99
C. S. Meal 1-3....				106 C. S. Meal	
Corn 2-3				314 Corn	
C. S. Meal 1-3...				157 C. S. Meal	
Grazed sorghum	5	.43	90	.15 acre sorghum	5.90
Corn 2-3				181 Corn	
C. S. Meal 1-3....				90 C. S. Meal	
Soiled sorghum	5	.75	82	.13 acre sorghum	3.39

Where a combination of corn and cotton seed meal was fed rapid and economical gains were made; this was inva-

riably the case in these experiments no matter under what conditions fed. When cotton seed meal is fed properly the hog will either make rapid gains or die. As stated elsewhere there have been no deaths during these series of tests where the hogs received a large ration of cotton seed meal, but this is no guarantee that deaths may not occur next year.

The hogs (lot 2) which grazed the sorghum down made a poor showing,—in fact the sorghum was a detriment instead of a help in this case. Where the hogs had the sorghum carried to them, (lot 3) the data show that .13 of an acre saved but $.60, or a whole acre of green sorghum after being cut and hauled to the hogs was worth but $4.61.

Under the conditions in which sorghum was fed in these experiments it was found to be almost worthless as a supplement to either corn or to a mixed ration of corn and cotton seed meal. It would no doubt be more valuable when fed to larger hogs than were used here. As used in these tests it was not found to be adapted to hogs which were being fattened. Probably one of the chief reasons why it is not a profitable hog feed is that it requires too much work on the part of the hog to extract the juice, and this work prevents the hog from laying on fat. A hog receiving only a two-per-cent grain ration and green sorghum is never satisfied; he always wants to get out of the inclosure, and when he is not trying to get out he is either chewing the cane or rooting in the ground.

Sorghum has probably one valuable place as a hog feed—to help carry the brood sows through the summer months economically when the pastures become short. Sorghum is a bulky feed and is more suited to ruminants—animals with a system of stomachs, as that of the cow and the sheep—than to the hog. The hog makes no use of the leaves and the fibrous part of the stalk at all; his stomach is too small for such bulky roughage. He eats the juice only, and much of that even is lost while he is chewing the stalk.

It should be remembered that this bulletin reports no sorghum experiments in which the plant was grazed when young; in every case the sorghum was far enough advanced so that the juice was sweet to the taste. Some farmers report success with the plant when the hogs are turned into the field when it is about one foot in height, thus inducing them to eat the tender blades along with the immature juice.

Soy Beans.

Soy beans is another leguminous crop which has proven very satisfactory as a green crop with which to supplement corn in pork production. The hogs in this experiment were turned into the field two weeks before the beans were matured sufficiently to be eaten so that for the first two weeks the swine had only the leaves and the stalks to eat, in addition to the two per cent corn ration. The hogs did not touch the beans themselves for about fifteen days after being turned into the patch. The leaves, both dead and green ones, were eaten with relish. It might have paid better to have kept the hogs off the beans until the seed were ripened sufficiently to be eaten,—that is a point open for further experimentation.

Table 6. *Soy bean pasture as a supplement to Corn.*

Ration	No. Animals Used	Average Daily Gains	Average Initial Weight of Pigs	Feed Required per 100 lbs. gain	Cost of Concentrate per 100 lbs. gain
		Lbs	*Lbs.*	*Lbs.*	
Corn alone	6	.78	73	456	$5.70
Corn	6	1 02	77	157 Corn .28 acres soy beans	1.96
Soy bean past'r					

Considering the beginning weights of the pigs, both lots made good gains, but the gains of the soy bean lot were much better than those of the corn lot. Running right by the side of the soy bean lot was a lot of pigs which were grazing sorghum, but otherwise treated the same in every

respect, yet the sorghum lot made a daily gain of only .37 of a pound.

The corn required to make an hundred pounds gain was reduced from 456 pounds in the case of corn alone to 157 pounds when the corn was supplemented by the soy bean pasture, and the cost of producing the pork was reduced in the same proportion.

It was noticed that the pigs which grazed upon the soy beans were always contented; they spent the greater part of their time in lying down. The pigs just across the fence, which were grazing the sorghum, were never contented or at rest; it could plainly be seen that they wanted something in addition to the corn and sorghum.

The above table shows that .28 of an acre of soy beans was equal to 299 pounds of corn, or an acre was equal in feeding value to, or capable of taking the place of, 19.1 bushels of corn. As noted elsewhere, the crop of soy beans was not a good one, as the beans were cut short on account of extreme drought at the time of maturing. This crop is a very economical and easy one to put in and cultivate; it is good to use it as a catch crop after oats, thus saving the ground from lying idle during the summer months, and at the same time securing a crop equal to, and in many ways superior to a corn crop. In this way, the farmer secures two crops from the same land each year, cheapens pork production very greatly, and builds up the fertility of his soil rapidly. If the soil be good much better results can be secured than reported above, as the soil upon which this crop was grown was a poor sandy one.

TABLE 7. *Sorghum pasture versus Soy Bean pasture.*

Ration	No. Animals Used	Average Daily Gains	Average Initial Weight of Pigs	Feed Required Per 100 lbs. Gain	Cost of Concentrates Per 100 lbs. Gain
		Lbs.	*Lbs.*	*Lbs.*	
Corn				437 Corn	
Sorghum past'r	6	.37	73	.57 acre sorghum	$5.46
Corn				157 Corn	
Soy bean past'r	6	1.02	77	.28 acre soy beans	1.96

The soy bean pasture is far above the sorghum pasture both in the daily gains made and also to the economy of the gains. The daily gains were about three times as rapid when the bean pasture was used as when the sorghum pasture was used, and the cost of making one hundred pounds of gain was reduced from $5.46 in the case of sorghum to $1.96 when soy beans were used as a supplementary pasture.

The soy bean pasture also had a much greater carrying capacity than did sorghum pasture; that is an acre of soy beans will usually carry a certain number of hogs a much longer time than will an acre of sorghum.

COWPEAS (SEED) AS FOOD FOR HOGS.

TABLE 8. *Corn alone versus Corn* 1–2 *plus Cowpeas* 1–2.

Ration	No. Animals Used	Average Daily Gains	Average Initial Weight of Pigs	Feed Required Per 100 lbs. Gain	Cost of Concentrates Per 100 lbs. Gain
		Lbs.	*Lbs.*	*Lbs.*	
Corn alone	4	.74	63	478 Corn	$5.97
Corn 1-2				187 Corn	
Cowpeas 1-2	4	.93	67	208 Cowpeas	5.11

Under the conditions as they existed in this test it was a profitable thing to supplement corn with cowpeas. Estimating cowpeas at 80 cents a bushel there was a saving of 86 cents for each hundred pounds of pork made through the use of the cowpeas.

Peas at the present writing (July, 1908) are not as cheap as they were in 1905–'06. Under the test as above reported peas would have been a profitable supplement to have added to the corn ration until they reached $1.05 per bushel, and then it would have been better to have fed corn alone at $.70 a bushel. When cowpeas are maintained at a high price they must be fed more sparingly than they were in this experiment.

In some previous work done at this Station* in testing the value of cowpeas as a feed for swine, one lot of hogs was fed upon a ration consisting of cowpeas alone. It was learned that when corn and cowpeas were fed separately and alone that they were practically equal in feeding value, but that when a ration was composed of one-half corn and one-half cowpeas the result due to feeding this mixture was much more satisfactory than when feeding either alone. The results were as follows:

TABLE 9. *Corn and Cowpeas separately versus Corn* 1–2 *plus Cowpeas* 1–2.

Ration	Average Daily Gains	Feed Required Per 100 lbs. Gain	Cost Per 100 lbs. Gain
	Lbs.	*Lbs.*	
Corn alone	.46	487	$6.09
Cowpeas alone	.59	481	6.41
Corn 1-2, Cowpeas 1-2	.62	433	5.60
Corn 1-2, Wheat brand**	.60	521	7.05

*Bulletin No. 82, 1897.

**Wheat bran valued at $30.00 per ton.

This table also points out the fact that cowpeas were very much more efficient than wheat bran as a feed for swine.

Tankage.

While tankage has not been used very extensively in the South as a hog feed, still it deserves a prominent place amoung the concentrated feeds which are usually brought to the feed pens from sources outside the farm. It is a by-product of the packing houses. It is very high in both ash and protein—just the two constituents in which corn is deficient—so it is an exceptionally good feed to use in conjunction with corn. It is somewhat similar to cotton seed meal in composition but has the advantage over cotton seed meal in that there is no danger in its use as a hog feed. It is a very rich feed, so should be used sparingly; in these tests it made up but one-tenth of the whole ration as a rule. The results secured through its use are tabulated below:

Table 10. *Corn alone versus Corn* 9–10, *Tankage* 1–10.

Ration	No. Animals Used	Average Daily Gains	Average Initial Weight of Pigs	Feed Required Per 100 lbs. Gain	Cost of Concentrates Per 100 lbs. Gain
		Lbs.	*Lbs.*	*Lbs.*	
Corn alone	6	.60	73	574.7 Corn	$7.18
Corn 9-10				352 Corn	
Tankage 1-10....	6	1.04	69	39.2 Tankage	5.18

The tankage and corn meal were fed together as a rather thin slop. This feed is very palatable. When corn was reinforced by the use of tankage it was found, under the conditions as they existed in this test, that 39.2 pounds of tankage were equal to, or took the place of, 222 pounds of corn. The 39.2 pounds of tankage cost $.78; the 222 pounds of corn cost $2.78; thus a saving of $2 was realized upon

each 100 pounds of pork produced by adding tankage to corn.

The test was carried on for 91 days, and it was noticed that those pigs which received corn alone made smaller and smaller gains as the experiment progressed, but the animals which received the tankage in addition to the corn made larger and larger gains as the time went on.

The corn lots would have tired of their ration long before they did had it not been for the fact that they always had all the salt, coal and lime before them that they wished to make use of.

It was thought that if the proportion of tankage were increased to more than one-tenth of the ration that enough corn might be saved to make up for the extra tankage used. This was tried in a short test where all the conditions of previous feeding favored the lot on the high proportion of tankage; that is, the lot of pigs which received the high tankage ration had just been taken off of a peanut pasture, which insured very rapid gains for at least a short time, while the lot which received the one-tenth ration of tankage had not been upon a pasture at all, but had been fed a uniform dry ration since the beginning of the test.

TABLE 11. *A one-tenth ration of Tankage versus a one-fifth ration of Tankage.*

Ration	No. Pigs Used	Average Daily Gains	Average Initial Weight of Pigs	Feed Required Per 100 lbs. Gain	Cost of Concentrates Per 100 lbs. Gain
		Lbs.	*Lbs.*	*Lbs.*	
Corn 9-10	4	1.26	120	350 Corn	$5.01
Tankage 1-10				31.9 Tankage	
Corn 4-5				274 Corn	
Tankage 1-5	4	1.83	142	67.3 Tankage	4.77

By the addition of 35.4 pounds of tankage to the ration

for each hundred pounds gain a saving of 76 pounds of corn was secured. This additional tankage cost $.71 and the value of the corn saved as a result of the addition of the tankage amounted to $.96—or a saving of $.24 on each one hundred pounds of the pork was realized. But it must be remembered that the previous management of the hogs placed the heavy tankage lot at an advantage,—how much, it is impossible to say.

As tankage is a comparatively new feed to the Alabama farmer it is appropriate to present the following table, so there can be seen at a glance its composition as compared to our more common feeds:

TABLE 12. *Average composition of some common feeds.*

Name of Feed	Dry Matter in 100 lbs.	Digestible Nutriment in 100 lbs.		
		Protein	Carbohydrates	Ether Extract
Corn	93.0	31.7	15.3	4.3
Cowpeas	91.8	37.2	16.9	1.1
Oats	89.0	9.2	47.3	4.2
Cotton seed meal	85.2	18.3	54.2	12.2
Tankage	89.4	7.8	66.7	13.6

COTTON SEED MEAL.

The deaths that sometimes occur through feeding cotton seed meal deter the majority of farmers from using it as a feed for swine. There is no Southern feed to compare with it as a supplement to corn so far as fattening and finishing is concerned. But there is a risk to run, and the man who feeds it has this risk to shoulder. During the last three years this Station has had about fifty hogs upon cotton seed meal rations fed in various proportion with corn, and extending over periods from 28 to 188 days in length. Some of the meal has been fermented and some of it has been fed unfermented. During the first two years above reported the meal was fermented twenty four hours

before being fed, then mixd with corn meal so as to make a thin slop of about the consistency of thick butter milk and given to the animals. The meal was fed sweet in 1907'08. No pigs were lost at all during the first and the last year's experimentation, but during the progress of the second year's work several pigs died that had previously been fed on fermented cotton seed meal. However, during the three years' work not a pig died *while he was actually eating* the cotton seed meal; the deaths occured immediately, or within a few days, after a lot of pigs which had been upon a ration of two-thirds corn and one-third cotton seed meal plus sorghum pasture, had been taken out and put upon a peanut pasture plus a corn ration only. That is, the deaths occured—four of them—from one to eight days after the *cotton seed meal ration had been discontinued.* The animals all died with the characteristic symptoms of cotton seed meal poisoning.

Aside from the deaths that may occur, cotton seed meal is a good feed, as will be shown later. It has even now one safe place at least in our swine feeding operations, namely, to be used in a short finishing period when hogs have been taken off of a pasture crop. The following table presents in a tabulated form the average of two year's work with cotton seed meal when both the corn lot and the cotton seed meal lot were fed without any pasture crop.

TABLE 13. *Corn alone versus Corn 2-3, Cotton Seed Meal 1-3*

Ration	No. Pigs Used	Average Daily Gains	Average Initial Weight of Pigs	Feed Required Per 100 lbs. Gain	Cost of Concentrates Per 100 lbs Gain
		Lbs.	*Lbs.*	*Lbs.*	
Corn alone	11	.65	78.5	590	$7 38
Corn 2-3				303 Corn	
C. S. Meal 1-3.....	11	1.00	77.	157 C. S. Meal	5.75

Not a pig in this particular experiment died while being fed either fresh or fermented cotton seed meal; on the other hand they made good gains, maintained their health throughout, and always had keen appetites for the next feed. Considering the size of the pigs the gains were very satisfactory when the cotton seed meal was used, and the increase in weight was made very much more economically than was the case in the corn lot. The tests show that 151 pounds of cotton seed meal are equal to, or took the place of, 287 pounds of corn; or one pound of cotton seed meal when fed in combination with corn meal in the above proportion was equal to 1.9 pounds of corn. When fed thus the cotton seed meal becomes a highly valuable and cheap feed—provided no deaths occur as a result of its use.

The above tests extended over a period of 102 days.

TABLE 14. *Corn alone versus Corn* 1–3 *plus Cotton Seed Meal* 1–3 *versus Corn* 9–10 *plus Tankage* 1–10

Ration	No. Pigs Used	Average Daily Gains	Average Initial Weight of Pigs	Feed Required Per 100 lbs. Gain	Cost of Concentrates Per 100 lbs. Gain
		Lbs.	*Lbs.*	*Lbs.*	
Corn alone	6	.60	73	574.4 Corn	$7.18
Corn 2-3				263.8 Corn	
C. S. Meal 1-3	6	1.03	69	131.9 C. S. Meal	4.95
Corn 9-10				352.4 Corn	
Tankage 1-10	6	1.04	69	39.2 Tankage	5.18

In the proportion as fed above the cotton seed meal was more efficient than the tankage in saving corn, a result possibly due to the larger proportion of meal. The cotton seed meal also made 100 pounds of pork a little cheaper than did the tankage, as one hundred pounds live weight was made for $4.95 when the cotton seed meal was used,

but the same one hundred pounds increase in weight cost $5.18 when the tankage was used.

No deaths occurred in either lot, but there was some danger of deaths in the cotton seed meal lot while there was no danger at all of any deaths in the tankage lot.

There was pratically no difference between the two rations so far as daily gains were concerned, both feeds making extremely satisfactory gains.

These tests extended over a period of 91 days.

General View of Results of Three Years' Feeding Experiments.

The following table is a summary by periods of the feed fed, the average daily gains, the feed required for one hundred pounds gain, and the cost of one hundred pounds gain each year. Each period is tabulated separately. It should be noted that while this is expressed by periods that some of the lots ran through all three of the periods without a change in feed. Lots five and six during the first two years continued through all three periods without a change. Lots four, five and six were all fed in dry lots and no changes at all were made in their ration:

Table 15.—Summary of rations, gains, feed required for One Hundred pounds gain, and cost of one hundred pounds gain for the three years

1905---06

No. Lot	PERIOD I (.....) RATION	Average daily gains	Feed required per 100 lbs gain: Concentrates	Feed required per 100 lbs gain: Green Areas	Cost of concentrates per 100 lbs gain	PERIOD II (Sep. 21—Nov. 10, '05) RATION	Average daily gains	Feed required per 100 lbs gain: Concentrates	Feed required per 100 lbs gain: Green Areas	Cost of concentrates per 100 lbs gain	PERIOD III (Nov. 10—Dec. 15, '05) RATION	Average daily gains	Feed required per 100 lbs gain: Concentrates	Feed required per 100 lbs gain: Green Areas	Cost of concentrates per 100 lbs gain
		Lbs	Lbs	Acs	$		Lbs	Lbs	Acs			Lbs	Lbs	Acs	
1						Peanut pasture Corn	.84	191 Corn	.087	$2.38	Corn only	.71	587 Corn		$ 7.34
2						Peanut Pasture Corn	.98	164 Corn		2.05	Corn 2-3 C. S. Meal 1-3	.89	342 Corn 171 C.S.Meal		6.41
3						Peanut Pasture Corn 2-3 C. S. Meal 1-3	.99	107 Corn 53 C.S.Meal	.08 Acr	1.93	Corn Meal 2-3 C. S. Meal 1-3	.77	384 Corn 192 C.S.Meal		7.20
4						Sorghum Juice Cowpeas 2-3 Corn 1-3	1.11	207 Cowpeas 103 Corn		4.03	Sorghum juice Corn 2-3 Cowpeas 1-3	1 01	380 Corn 190 C.S.Meal	059†	7.23
5						Cowpeas 2-3 Corn 1-3	.91	264 Cowpeas 132 Corn		5.18	Corn 2-3 Cowpeas 1-3	.90	360 Corn 180 Cowpeas		6.90
6						Corn only	.67	560 Corn		7.00	Corn only	.66	554 Corn		6.92
						1906—07									
	Period I (Aug. 8—Sep. 26, '06					Period II (Sep. 26—Oct. 24, '06					Period III (Oct. 24—Nov. 28, '06				
1	Soiled Sorghum Corn 2-3 C. S. Meal 1-3	.75	181 Corn 90 C.S.Meal	.13	$3.30	Peanut Pasture Corn	1.56				Corn only	1.60	573 Corn		7.16
2	Grazed Sorghum Corn 2-3 C.S.Meal 1-3	.43	314 Corn 157 C.S.Meal	.15	5.88	Peanut Pasture Corn	1 16	196 Corn	.24	$ 2.43	Corn 2-3 C S Meal 1-3	1.25	221 Corn 110 C.S.Meal		4.15
3	Corn 2-3 C. S. Meal 1-3	.94	250 Corn 125 C.S.Meal		4.68	Peanut Pasture Corn	.96				Corn 2-3 C. S. Meal 1-3	.91	893 Corn 196 C.S Meal	1800 ponnds Japanese Sugar Cane	7.36
4	Sorghum Juice Corn 2-3 C. S. Meal 1-3	.91	155 Corn 77 C.S.Meal	.19‡	2.90	Chufa Pasture Corn	.72	305 Corn	.41	3.81	Japan cane Corn 2-3 C. S. Meal 1-3	.97	206 Corn 103 C.S.Meal		3.86
5	Corn 2-3 C. S. Meal 1-3	1.18	212 Corn 106 C.S.Meal		3.97	Corn 2-3 C S Meal 1-3	.96	366 Corn 183 C.S.Meal		6.86	Corn 2-3 C. S. Meal 1-3	.54	605 Corn 202 C.S.Meal		11.33
6	Corn only	.76	483 Corn		6.03	Corn only	.89	516 Corn		6.45	Corn only	.42	1195 Corn		14.93

	1907—08													
	Period I (Sept. 6—Oct. 2, 07					Period II (Oct. 2—Nov. 8, 07)					Period III (Nov. 8—Dec. 5, '07			
1	Soy Bean Pasture Corn	1.02	162 Corn	.28	$2.02	Peanut Pasture Corn	1.04				Corn 4-5 Tankage 1-5	1.83	371 Corn 68 Tankage	3.73
2	Grazed Sorghum Corn 2-3 C. S. Meal 1-3	.51	206 Corn 103 C.S.Meal	.37	3.86	Peanut Pasture Corn	1.14	195 Corn	.24	$ 2.25	Corn 2-3 C. S. Meal 1-3	1 33	334 Corn 117 C.S.Meal	4.39
3	Grazed Sorghum Corn	.37	336 Corn	.57	5.57	Peanut Pasture Corn	.96				Corn only	1.35	353 Corn	4.44
4	Corn 9-10 Tankage 1-10	.93	332 Corn 57 Tankage		4.89	Corn 9-10 Tankage 1-10	.93	480 Corn 43 Tankage		5.66	Corn 9-10 Tankage 1-10	1.26	354 Corn 39 Tankage	5.20
5	Corn 2-3 C. S. Meal 1-3	1.01	336 Corn 118 C.S.Meal		4.42	Corn 2-3 C.S. Meal 1-3.	1.08	246 Corn 123 C.S.Meal		4.61	Corn 2-3 C. S. Meal 1-3	.91	378 Corn 189 C.S.Meal	7.09
6	Corn only	.78	462 Corn		5.77	Corn only	.53	621 Corn		7.76	Corn only	.46	838 Corn	10.47

† 490 lbs Sorghum Juice.
‡ 983 lbs Sorghum Juice.
† 435 lbs Sorghum Juice. This area represents the average for both periods. The cane from which the juice was extracted was the large Florida.

As a general thing both the rapid gains and the cheap gains were made when the hogs received some kind of pasture crop in addition to the corn. The best kind of green crops were the leguminous crops, peanuts and soy beans. As far as these experiments show, sorghum has but little value to recommend it as a green crop for finishing hogs—unless abundance of labor should permit the crop to be economically cut and hauled to the animals. Pigs when no larger than those used in these tests cannot graze it to any advantage.

Chufas proved more satisfactory than sorghum.

Table No. 15, in a way also shows the relative stands or yields of peanuts during the three years. The first year but .08 of an acre was required to make 100 pounds of gain, as against .89 of an acre for the third year, or the yield the first year was about ten times as great as that of the third year.

One acre of the various green crops carried 10 hogs (fed a half ration of concentrates) for the following length of time:

One acre of peanuts carried 10 hogs (Av. 3 years) 53 days.
One acre of sorghum carried 10 hogs (1906–'07) 153 days.*
One acre of sorghum carried 10 hogs (1907–'08) 46.6 days†.
One acre of chufas carried 10 hogs (1906–'07) 32.3 days.
One acre of soy beans carried 10 hogs (1907–'08) 34.4 days.

Since grain was fed with each crop the length of time that an acre was pastured does not indicate the relative value of an acre of the several crops.

It must be remembered that in all of the above cases the hogs received in addition to the green crop, some corn. If the corn had not been fed, of course, it would have required larger areas of green crops to get the same results. By taking an average of the three years' work it is seen that peanut pasture has a greater carrying capacity than any of the other green crops used.

*Sorghum was cut and carried to the hogs which were fed in a dry lot.
†Sorghum grazed.

Shall Hogs Which Have Been Grazed Upon Green Crops be Finished in a Dry Lot Upon Grain?

The majority of the farmers of the State who make use of green crops for fattening hogs sell the hogs directly upon the market when the crop is exhausted without finishing them upon grain for a short time in a dry lot. A study of period 3 (table 15) will throw some light upon this practice; it will help to determine whether it is profitable to feed in a dry lot for a few days upon grain alone. There are some contradictions when the three years' work are compared. The work of the first year favors selling hogs directly off the green crops; that is, the finishing period of thirty five days of dry lot feeding was a losing proposition in all cases for this year. In fact the hogs which had been fed in a dry lot throughout the entire test went through the finishing period more economically than did those hogs which had grazed peanuts for fifty days previous to the finishing period. But during the last two years' work those hogs which had been previously grazed upon a green crop made their gains in the third period more cheaply than did those which had never been given the run of a pasture crop.

During the second year's third period money was lost in the case of two lots, 1 and 3, (previously pasturing peanuts) the gains when feeding in dry lots costing from $7.16 to $5.39 per hundred, and these gains could be sold for only $5.00 per hundred on the local market. If these hogs could have been put upon some of the larger markets in the South there would probably have been some profit even in these two lots. In all lots in 1907–'08, where the hogs were finished for a period of twenty eight days after taking off of peanuts, the subsequent period of dry lot feeding was found to be exceedingly profitable. During this year's work the lots which had previously been upon peanuts made unusually large gains, and made these gains economically. While the results are not all in agreement, yet they seem to indicate that it is more often profitable to finish

hogs upon dry feeds rather than to sell directly from pastures.

In all three years' work cotton seed meal was found to be a very valuable feed with which to supplement corn for finishing hogs after they had been grazed upon a green crop,—in fact the most valuable of any so far tried. That is, these finishing gains can be made more cheaply through the use of cotton seed meal combined with corn than by the use of corn alone, or corn supplemented with tankage. Cotton seed meal is an excellent feed for fattening purposes. On the average the data show that corn and cotton seed meal can be used very profitably as a short finishing feed. In other words it is usually advisable to combine corn and cotton seed meal and to dispose of some of the corn on the farm by feeding during a short finishing period, say 20 days, after the hogs have been taken off of the peanut pasture, because usually more than 70 cents a bushel can be realized upon the corn by this practice. It might not be a wise thing to keep the hogs upon this feed for as long as twenty-eight days, as deaths may occur from feeding the cotton seed meal for this length of time. In these tests no animals have died from feeding cotton seed meal for 28 days during the finishing period. It will be perfectly safe to use the cotton seed meal for at least twenty days.

There is another advantage to be gained by finishing hogs for a short period after taking them off of green crops, namely, better prices can be realized for them when placed upon the market. The hog looks better, and is actually worth more to the consumer or packer, as he is fatter and will dress out a higher per cent of good marketable meat than if he had been sold directly from the pasture. The corn-fed hog has a decided advantage in all the Southern markets.

In this connection the point should not be overlooked how extremely expensive the gains become along about the last month of feeding when hogs are being fattened upon corn alone, running from $7.00 a hundred in one case to

about $15.00 per hundred increase in live weight in another case.

When hogs have been grazed upon peanuts, and certain other green pastures, there is yet another advantage to be gained in feeding them upon dry feeds a short time before selling. It is well known that peanuts soften the meat very much, so that it is not as acceptable to many butchers and to the packers as the animals that have been fed upon grain alone. This soft meat can be hardened very materially, if the hogs are fed upon grains only for a short period after the peanuts are exhausted. Corn is good; corn in combination with cotton seed meal is better than corn alone, as the addition of some cotton seed meal to the ration renders the meat hard more rapidly than when corn alone is used.

Summary of Average Results for Three Years.

In table number sixteen is brought together the summary, or average, of the experimental work for three years. The average shows that large gains and cheap gains go with the use of green crops and that the best green crops are the legumes. The table also demonstrates strikingly that small gains and the high priced gains go with the use of corn exclusively. Every supplement used with corn cheapened the gains, no matter whether it was a pasture supplement or another concentrate—except when the cost of putting in and cultivating the crops was charged against the gains, when sorghum and chufa pastures were found to be of no advantage.

In comparing lots 2 and 3 there seems to be an apparent contradiction to the data presented heretofore; that is table No. 14 taught that cotton seed meal produced gains more economically than did the tankage, while in this table the cheaper gains seem to have been made with tankage. This is due to the fact that the data for lot 2 in the present table are a summary of two years' work, while in table 14 only the last year's test was used, so that a direct comparison could be made between the cotton seed

Table 16. *Average total summary of* 1905–'06; 1906–'07; 1907–'08.†

No. Lot	Ration	No. Pigs in Test	Average Daily Gains	Feed Required Per 100 lbs. Gain		Cost of Concentrates Per 100 lbs. Gain
				Concentrates	Pasture Areas	
			Lbs.	*Lbs.*	*Acre*	
1	Corn only	15	.69	611 Corn		$7.63
2	Corn 2-3 C. S. Meal 1-3	11	1.04	303 Corn 157 C. S. Meal		5.75
3	Corn 9-10 Tankage 1-10	6	1.04	352 Corn 38 Tankage		5.18
4	Corn 1-2 Cowpeas 1-2	4	.94	187 Corn 207 Cowpeas		5.11
5	*Corn Peanut pasture	32	1.01	183 Corn	.44	2.28
6	*Corn Meal 2-3 C. S. Meal 1-3 Peanut pasture	4	1.00	107 Corn 51 C. S. Meal	.08	1.97
7	Corn Sorghum past'r	6	.37	437 Corn	.57	5.36
8	Corn 2-3 C. S. Meal 1-3 Sorghum past'r	11	.46	259 Corn 129 C. S. Meal	.26	4.85
9	Corn Chufa pasture	3	.72	305 Corn	.41	3.81
10	Corn Soy bean past'r	6	1.02	158 Corn	.28	1.96
11	Corn Meal 2-3 C. S. Meal 1-3 Soiled sorghum	5	.75	181 Corn 90 C. S. Meal	.13	3.39

*Lots 5 and 6 are not comparable. It would seem, on the face, that the addition of cotton seed meal to the corn and peanut ration worked wonders, but this cannot be compared to lot 5 as lot 5 takes in all the years, (and the last two years had very poor stands), while the data in lot 6 were obtained only in 1905 when the stand of peanuts was extra good.

†Cost of putting in and cultivating the pasture crops not taken into consideration.

meal and the tankage. Table 14 is more reliable on this single point than the present table.

The results from the use of the chufa pasture has not been discussed so far, as so few animals were used that any conclusions drawn could not be relied upon absolutely. But, looking at lot 9, it is seen that the daily gains made upon the chufa pasture, while not as good as those made upon soy bean and peanut pastures, are much better than those made when sorghum was used. It is also seen that the chufa pasture saved corn.

Cost of Gains When Manural Value and Expense of Putting in and Cultivating the Crops are Considered.

In the above table there has been no expense charged against the hogs on account of putting in and cultivating the pasture crops. Neither has there been any credit given to the soil by reason of there having been grown upon it leguminous crops. The manure dropped by the animals while grazing the crops has not been credited to the soil.

Of course there is no figure which will express the exact cost of putting in a crop under all conditions, as conditions vary with different localities. Neither are there any exact figures to tell just how much good will come to the soil as a result of growing a leguminous crop; this varies with different soils and with many other conditions. So the following estimate is based upon the approximate average cost of putting in crops upon the Station farm, and the fertilizing value of a leguminous crop is based upon work done here and reported in previous bulletins.

The cost of putting in and cultivating each acre of the various crops, counting labor at eighty cents a day and one man with one mule at one dollar a day, was approximately as follows:

PEANUTS:

To one bushel seed	$ 1.90
To commercial fertilizer	1.50

To breaking the land	1.00
To harrowing the land	.20
To putting down the seed and fertilizer	1.00
To cultivating three times	1.20
To hoeing one time	.80
To rent or interest	2.00
Total cost of each acre	$9.60
By assumed increase in next year's crop due to fertilizer effect of peanuts and grain fed (partly based on Alabama Bulletins 120 and 137)	$ 7.50
Net cost of one acre peanuts	$ 2.10

SOY BEANS:

To one bushel seed	$ 2.20
To commercial fertilizer	1.50
To breaking the land	1.00
To harrowing the land	.20
To putting down the seed and fertilizer	1.00
To cultivating four times	1.60
To hoeing one time	.80
To rent or interest	2.00
Total cost of each acre	$10.30
By assumed increase in next year's crop due to fertilizing effect of peanuts and grain fed	$ 7.50
Net cost one acre soy beans	$ 2.80

SORGHUM:

To one-half bushel seed	$ .75
To commercial fertilizer	5.00
To breaking the land	1.00
To harrowing the land	.20
To putting down the seed and fertilizer	.75
To cultivating four times	1.60
To rent or interest on land	2.00
Total cost of each acre	$11.30

(No credit for soil improvement)

CHUFAS:

To one peck of seed	$ 1 00
To commercial fertilizer	5.00
To breaking the land	1.00
To harrowing the land	.20
To putting down the seed and fertilizer	1.00
To cultivating four times	1.60
To hoeing one time	.80
To rent or interest on land	2.00
Total cost of each acre chufas	$12.60

(No credit for soil improvements).

Counting the expense of putting in and cultivating the green crops as above, the cost of making one hundred pounds gain on the hogs in each one of the lots was as follows:

TABLE 17.

Lot 1—Corn alone	$ 7.63
Lot 2—C. S. Meal 1–3	5.75
Corn 2–3	
Lot 3—Corn 9–10	
Tankage 1–10	†5.18
Lot 4—Corn 1–2	
Cowpeas 1–2	5.11
Lot 5—Corn	
Peanut pasture	*3.20
Lot 6—Corn 2–3	
C. S. Meal 1–3	*2.14
Peanut pasture	
Lot 7—Corn	
Sorghum pasture	†1.96
Lot 8—Corn 2–3	
C. S. Meal 1–3	†7.79
Sorghum pasture	
Lot 9—Corn	
Chufa pasture	†8.98
Lot 10—Corn	
Soy Beans	2.74
Lot 11—Corn 2–3	
C. S. Meal 1–3	†4.86
Soiled sorghum	

When all expenses are *charged against putting in these green crops,* it is seen that sorghum makes a very poor showing, even inferior to corn when fed alone. Looked at from every point of view it seems that mature sorghum (pastured) has no place as a feed for finishing swine. It seems that it might, under certain conditions where labor can be contracted and secured cheaply, be a profitable

*Lots 5 and 6 not to be compared; see foot note to Table 16.
†Data for one year only.

thing to grow sorghum and cut it when ripe and carry it to the hogs. In lot II, where it was so handled economical gains were made; but the labor of cutting the sorghum and carrying it to the hogs has not been included in the estimate. The hogs made very much more economical use of the sorghum as far as the sorghum itself was concerned, when it was cut and fed to them in a dry lot than when they were permitted to graze it, that is, the waste was not so great in soiling sorghum.

The chufa pasture also made a very poor showing, but the gains were somewhat cheaper than when the sorghum pasture was used. Neither sorghum nor chufas are legumes.

The greatest profits were made when a leguminous crop was used to supplement the corn. In fact, in all cases where either peanuts or soy beans were used profits were realized even if no credit be given for the improvement of the soil. The results in lot 6 more nearly represents what the farmer can expect from the use of peanuts than those with lot 5, as lot 6 represents only one year's experiment, when there was a good stand of the nuts, while lot 5 is an average of all the three years' work, which includes two years of very poor crops.

TABLE 18. *Financial Statement.* (*Summary* 1905–'06 1906–'07, 1907–'08.)††

No. Lot	Ration	No. Pigs Used	Initial Cost of Whole Lot	Cost of Grain Given each Lot	Total Cost of the Hogs Plus the Concentrates	Selling Price Whole Lot at 5 cts per lb.	Profit on Whole Lot	Profit Per Pig After Charging Corn Against them at 70 cts per bu.	Price Actually Realized for each Bu. Corn
1	Corn only.....	15	$ 56.30	$59.60	$111.50	$ 97.90	$—18.00	$—1.20	$ .48
2	Corn 2-3 ..... C. S. Meal 1-3..	11	42.20	54.15	96.35	90.65	— 5.70	— .51	.59
3	Corn 9-10 ..... Tankage 1-10..	6	20.85	24.49	45.35	44.35	— .99	— .16	.66
4	Corn 1-2.. ..... Cowpeas 1-2	4	13.50	16.13	29.63	27.00	— 2.63	— .65	.47
5	Corn ..... Peanut past'r..	32	142.20	26.10	168.20	199.00	30.80	.96	†1.53
6	Corn 2-3 ..... C. S. Meal 1-3 Peannt past'r..	4	11.85	3.95	15.80	21.80	6.00	1.50	†2.30
7	Corn ..... Graz'd sorgh'm	6	21 95	4.26	26.21	25.85	.36	.06	.64
8	Corn 2-3 ..... C. S. Meal 1-3 Graz'd sorgh'm	11	45.00	10.46	55.46	55.75	.29	.03	.72
9	Corn ..... Chufa past'r...	3	16.40	2.33	18.73	20.05	1.32	.44	1.10
10	Corn ..... Soy bean past'r	6	23.20	4.26	27.46	34.00	6.54	1.09	1.80
11	Corn 2-3 ..... C. S. Meal 1-3 Soiled sorgh'm	5	20.70	5.05	25.75	30.00	4.25	.85	*1.58

*Labor of cutting and hauling is not included.
‡And the other feeds as ffuoted on page 6.
†Lots 5 and 6 are not comparable; see note to Table 16.
††Taking no account of the cost of growing the pasture crops.

From the financial statement in table 18 it is seen that when corn is worth 70 cents a bushel, cotton seed meal $25.00 per ton, tankage $40.00 a ton, and cowpeas 80 cents a bushel, some of the lots made good profits, while other lots were fed at a financial loss. That is, some of the lots of hogs returned more than the market price for the feeds used while some of the lots did not make gains economical-

ly enough so that the usual market prices for corn and the other grains used could be realized. By the use of certain combinations of feeds it was a very profitable thing to do to dispose of the corn by means of feeding hogs; more was made by thus disposing of it than if it had been sold directly upon the market at 70 cents a bushel; when the corn was fed incorrectly, or not judiciously, money was lost by feeding it to the hogs.

Lot 1, the corn lot, made the greatest loss of any of the pens; lot 6 made the largest profits. The corn lot lost $1.20 per pig. This was a very heavy loss for the pigs weighed but 130 pounds each. From a financial standpoint it proved to be advisable to supplament the corn ration with cotton seed meal and tankage.

The ration of corn one-half plus cowpeas one-half was not as profitable as when corn was supplemented with the cotton seed meal or tankage, there being a loss upon each pig of $.65 when fed on cowpeas and corn. It is but fair to state that under present conditions, and in fact since 1905, the financial showing in lot 4, where corn and cowpeas were fed would not be as good as the above data represent, for when the test was made the cowpeas were purchased for 80 cents a bushel, and have been so figured in the financial statement, but it has been impossible to purchase them for the above price since that date.

Where pasture crops were used in combination with grain good profits were made possible—that is, more than 70 cents a bushel was realized upon corn from the feeding operations. This last table does not include the cost of putting in and cultivating the green crops, neither does it take into consideration the value to the land in having the pigs graze upon it. But if the manurial value be eliminated altogether and the pigs be charged with the cost of putting in and tending the crops it is still found that excellent profits were made when peanuts and soy bean pastures were used, but when chufa and sorghum pastures were used money was lost. The legumes made the best showing by far. In fact, when the cost of putting in the crops is

charged against the hogs the sorghum lots lost more money than did the lots upon corn alone.

This table again emphasizes the fact that money cannot be made by finishing hogs through the use of corn alone. The farmer cannot expect to sell his corn for 70 cents a bushel through hogs when the hogs have nothing else to eat except the corn—that is, he cannot do it when the hogs sell at five cents per pound live weight. The farmer could not afford to feed corn alone, no matter how high hogs might sell, for much more could be made out of the corn by combining it with some other feeds, either green or concentrated.

The last column in table 18 brings out some valuable points; here we find tabulated the prices which were obtained for each bushel of corn fed. In lot 1, where corn alone was fed, but $.48 per bushel was realized by feeding the corn to the hogs. When corn was supplemented with cotton seed meal and tankage the corn was sold through the hogs for $.59 and $.66 respectively. That is, through feeding tankage with corn the value of the corn was increased 18 cents a bushel. The greatest value was gotten from the corn when it was fed in connection with the leguminous crops, peanuts and soy beans; in these cases the prices received for the corn varied from $1.53 per bushel up to $1.80 per bushel. Much more was made out of the corn when it was fed in connection with a leguminous crop than would have been made had it been sold directly upon the market.

Profits Realized When Hogs Were Sold at Varying Prices.

The preceding table represents the profits and losses just as they actually occured at Auburn under the local market conditions. The hogs were bought for 5 cents a pound live weight and sold for 5 cents, upon the local market after being fed for from 84 to 112 days. If the hogs could have been placed upon Montgomery, Mobile, Birmingham, or New Orleans markets they would have

brought from 6 to 7 1–2 cents per pound on foot. So to illustrate what would have been made or lost under these varying conditions the following table is attached:

TABLE 19. *Profits realized when hogs are sold at various prices.*†

No. Lot	Ration	Profits per Pig when bought at 5c per lb. and sold at:- (after feeding from 84-112 days)					
		5 cts.	5½ cts.	6 cts.	6½ cts.	7 cts.	7½ cts.
1	Corn alone	—1.20	$—.55	$ .11	$ .75	$1.41	$2.06
2	Corn 2-3 C. S. Meal 1-3	—.51	.31	1.13	1.95	2.78	3.60
3	Corn 9-10 Tankage 1-10	—.16	.57	1.32	2.05	2.79	3.53
4	Corn 1-2 Cowpeas 1-2	—.65	.02	.69	1.33	2.04	2.72
*5	Corn Peanut pasture	.96	1.58	2.21	2.83	3.45	4.07
*6	Corn 2-3 C. S. Meal 1-3 Peanut pasture	1.50	2.04	2.58	3.12	3.66	4.20
7	Corn Grazed sorghum	.06	.48	.92	1.35	1.78	2.21
8	Corn 2-3 C. S. Meal 1-3 Grazed sorghum	.04	.54	1.04	1.58	2.12	2.62
9	Corn Chufa pasture	.44	1.10	1.76	2.42	3.08	3.76
10	Corn Soy bean pasture	1.09	1.65	2.21	2.77	3.33	3.89
11	Corn 2-3 C. S. Meal 1-3 Soiled sorghum	.85	1.45	2.05	2.65	3.30	3.95

†Cost of putting in crop not taken into account.
*Lots 5 and 6 are not comparable.

TABLE 20. *Prices realized upon each bushel of corn when hogs were sold at various prices.*

No. Lot	Ration	Price Actually Realized for Corn per Bushel when the Hogs were bought at 5 cts. and sold at					
		5 cts.	5½ cts.	6 cts.	6½ cts.	7 cts.	7½ cts.
1	Corn alone	$ .48	$ .60	$ .72	$ .84	$ .96	1.08
2	Corn 2-3 C. S. Meal 1-3	.59	.77	.95	1.13	1.38	1.49
3	Corn 9-10 Tankage 1-10	.66	.77	.88	.99	1.10	1.21
4	Corn 1-2 Cowpeas 1-2	.47	.71	.95	1.19	1.43	1.67
*5	Corn Peanut pasture	1.53	2.03	2.53	3.03	3.53	4.03
*6	Corn 2-3 C. S. Meal 1-3 Peanut pasture	2.33	2.92	3.51	4.10	4.65	5.28
7	Corn 2-3 Sorghum pasture	.64	1.06	1.48	1.90	2.32	2.74
8	Corn 2-3 C. S. Meal 1-3 Sorghum pasture	.72	1.28	1.48	2.40	2.96	3.52
9	Corn Chufa pasture	1.10	1.71	2.32	2.93	3.54	4.15
10	Corn Soy bean pasture	1.80	2.36	2.93	3.48	4.04	4.60
11	Corn 2-3 C. S. Meal 1-3 Soiled sorghum	1.58	2.20	2.82	3.44	4.06	4.68

*Lots 5 and 6 are not comparable.
†Cost green crop not considered.

If the hogs could have been sold at 6 cents a pound instead of at 5 cents a pound, every lot, even the corn lot would have been fed at a profit. Even when sold at 5 1–2

cents a pound all lots except the corn lot were profitably fed.

In these tests when the hogs were bought at five cents per pound and fattened and sold at five cents per pound, but 48 cents was realized per bushel for corn when corn was fed alone. This is about 22 cents a bushel less than could be secured for the corn if it had been sold directly upon the market. But when pigs were bought at five cents a pound and sold at seven cents a pound 96 cents was realized upon each bushel of corn even when nothing but corn alone was used.

But in every case where corn was fed in combination with some other feed a better price was secured for the corn, when neither the manurial value nor the cost of putting in the crop were considered; that is, corn was made more efficient by the addition of the various supplements. For instance in lot 5, where peanut pasturage was the supplement, $1.53 was realized upon each bushel of corn (not counting cost of pasture crops) when hogs were bought at five cents and sold at the same price, and $3.53 was realized upon each bushel of corn when they were bought at five cents and sold at seven cents per pound live weight.

This table brings out the point distinctly that when hogs sell as they have been selling in the South for the last few years that the farmer cannot afford to sell his corn upon the market at 70 cents per bushel, or even at $1.00 per bushel. The best and most profitable way to sell corn is to combine it with some other feed and sell it through hogs or some other live stock.

Slaughter Data.

In many parts of the State the local butchers quote the dressed weights of the hogs two cents higher than the live weight. For instance upon the Auburn market for the last three years the farmers have been given the choice of selling their hogs either at 5 cents a pound live weight or 7 cents a pound dressed weight. These quotations have stood inflexible, no reference at all being made to either

the degree of fatness or to the conformation or type of the animals offered.

TABLE 21. *Should the farmer sell his hogs at five cents live weight or seven cents dressed weight?*

Ration	No. Pigs	Average Live Weight at Killing Time	Average Dressed Weight	Per Cent. Dressed Weight to Live Weight	Value each Pig at 5 cts. Live Weight	Value each Pig at 7 cts Dressed Weight
Corn only	12	131	96	73.28	$6.50	$6.72
Corn 2-3 ..... C. S. Meal 1-3	9	181	130	71.82	9.05	9.10
Corn 9-10 ..... Tankage 1-10	5	158	116	73.42	7.90	8.12
Corn ..... Peanut pasture	5	131	100	76.33	6.55	6.00

While the above table does not include all the data that has been collected from the slaughtered animals, sufficient facts are presented to bring out the point that when hogs are fat enough to kill out about 72 per cent dressed weight that it makes pratically no difference whether they are sold at 5 cents a pound live weight or 7 cents a pound dressed weight. This table does not take into consideration the expense of killing the hog, which must be charged against the hog when he is delivered dressed, neither does it take into account the value of the internal fat and the other organs which go to the farmer when the contract calls for dressed animals. In most instances the value of the internal organs will just about pay for the expense of killing.

The point is brought out that when a hog is excessively fat, which means that he will dress about 80 per cent, it is more profitable to the farmer to sell him at 7 cents dressed weight than to sell him at 5 cents live weight. It would,

of course, be more profitable from the butcher's stand-point to buy him on the basis of live weight. That is, the fatter the hog the greater should be the difference between the live weight and the dressed weight quotations, so that all parties concerned may be treated with fairness.

Then, on the other hand, the type of hog, which is represented by the razor back, the small hammed, narrow backed, long legged kind, will lose the owner more money when they are sold at 7 cents dressed weight than when they are sold at 5 cents a pound live weight, because this type dresses out a small proportion of saleable parts. That is, the nearer the hog comes to representing the razor back type the smaller should the net quotations be over the live weight quotations.

The butcher who does not take these things into consideration is not treating his customers fairly. The man who raises hogs of correct type and takes pride in finishing them to prime condition is being discriminated against when the butcher has an arbitrary price like the above. Before a just value can be placed upon a bunch of hogs they must be seen, so that both type and the degree of fatness can be taken into consideration.

Some General Considerations in Swine Production.

It is sometimes claimed that pork production cannot be made a profitable business in the South since corn has advanced in prices. It is often said that the farmer can buy his pork cheaper than he can make it. But is must be remembered that pork has advanced in price as well as corn, that the cheapest side meat now costs from 10 to 12.5 cents a pound, and that hams and shoulders cost from 15 to 20 cents a pound. Corn has advanced in price more rapidly than has pork, but the South is in a position to change her feeding methods when corn, as a sole feed, gets out of reach. The Southern hog prices are higher than at either the St. Louis or Chicago markets. At the present writing, prices all over the South are substantially higher than they

are in Chicago. All conditions here are encouraging for hog production; we can grow the corn, we have the best markets, as far as prices are concerned, in America; and we can grow many kinds of pasture crops, the crops which cheapen pork production more than any other feed.

It is generally considered that there is no other feed equal to corn for pork production,—this is true, provided the corn is used judiciously. If it be fed alone for any length of time there are few feeds which are poorer than corn, as the preceding experiments strikingly demonstrate, but if it be fed in combination with other feeds its use is to be highly commended, and it can be used to great economical advantage, too, even though it sells upon the market for 70 cents a bushel.

The hog is not adapted to living on corn alone, and when we require it of him we are forcing him to do a thing which is not consistent with his nature. Man likes a mixture of feeds or a change in diet; so do the lower animals. The hog in its wild state is not compelled to live upon one feed alone. When wild and free to make its own choice he is omniverous, feeding upon roots, nuts, fish, grass, fruit, snakes, and in fact, but few feeds can be mentioned that he will not eat if he be given the opportunity. Our domesticated hogs have inherited the tendency to select their foods from a variety of substances, and when we enclose them in a pen and feed but one feed we can feel assured that we are not allowing them to reach their highest possibilities.

Probably those who claim that pork cannot be produced in the South at a profit mean that it cannot be produced on corn alone at a profit; if so, that is entirely correct. Experimental data show that pork cannot be profitably raised and finished upon corn alone when corn sells for 70 cents a bushel. The following table, made up from data collected from all parts of the United States, clearly demonstrates the fact that the man who tries to finish hogs on corn alone is following a losing business;

Table 22. Corn alone for fattening hogs.

Station	No. Pigs	Length Exp.	Average Daily Gains	Lbs. Feed to make 100 lbs. Gain	Cost 100 lbs. gain when Corn is:—			
					40 cts.	50 cts.	60 cts.	70 cts.
		Days	*Lbs.*					
Texas	10	83	.46	762	$ 5.44	$ 6.80	$ 8.15	$ 9.52
Texas	10	83	.43	868	6.20	7.75	9.30	10.85
Tennessee	3	60	1.00	460	3.88	4.10	4.93	5.75
Tennessee ...	3	60	1.00	416	2.97	3.72	4.46	5.20
Tennessee	7	.....	.50	410	2.93	3.6.	4.39	5.12
Alabama	3	60	.....	806	5.76	7.20	8.63	10.07
Alabama	3	35	.....	670	4.79	5.98	7.18	8.37
Alabama	3	56	.40	621	4.43	5.54	6.65	7.76
Alabama	15	96	.69	611	4.36	5.45	6.55	7.64
Indiana	3	70	1.56	432	3.09	3.86	4.63	5.40
Indiana	4	127	.67	520	3.72	4.65	5.57	6.50
Oklahoma	4	126	.62	470	3.36	4.19	5.03	5.87
Iowa	6	49	2.08	461	3.29	4.12	4.95	5.74
Wis. (4 trials)..	35	.....	1.69	459	3.28	4.09	4.87	5.74
Wis. (4 trials)..	35	.....	1.41	499	3.57	4.45	5.35	6.24
Average			.....	564	4.01	5.4	6.04	7.02

The average farmer under ordinary conditions will not miss the average far. And the average of the preceeding table points out the fact that when corn is worth 70 cents a bushel that the cost of each pound of gain will be just about 7 cents, when corn is selling at 60 cents a bushel each pound of gain put on will cost 6 cents, when corn is worth 50 cents a bushel each pound of gain will cost 5 cents, and when corn is worth only 40 cents a bushel pork can be made for only 4 cents a pound. The table shows that when 70-cent corn is fed to 5-cent hogs that the feeder is losing 20 cents per bushel on his corn. To come out even in Alabama 70-cent corn must go along with 7-cent pork if the owner is to strike even on feeding corn alone. As a general thing the farmers do not get 7 cents for their hogs. If corn were worth but $.40 per bushel, as it is in some of the Western States, it would be a very profitable thing to raise corn and feed it to 5 and 6-cent hogs; good

money could be made out of it, as the farmer would then be selling his $.40 corn by means of hogs at from $.50 to $.60 per bushel. But even in the corn belt States it is more profitable to supplement the corn with other concentrates or green crops,—a practice followed by the best Northern farmers.

The data recorded in this bulletin point the way to cheaper pork production in Alabama. If we are to make the most that there is to be made from pork, and at the same time build up and maintain our soils, we must make a liberal use of green crops. Alabama can grow green crops almost the year round as indicated by the following table:

Table 23. Succession of green crops suitable for hog grazing:

Crop	Time to Plant	Amount Seed Per Acre	No. days from planting time until grazing time
For fall planting.			
Alfafa	Sep't. 1 to Oct. 15	15 to 25 lbs.	90 to 120
Burr clover	Sep't. 1 to Oct. 1	15 to 20 lbs. cleaned seed 36 lbs. in burr	90 to 120
Oats	Sep't. 1 to Nov. 1	1½ to 3 bu.	90 to 120
Rape	Sep't. 20 to Oct. 15	4to 6 lbs. drilled 5 to 10 lbs. broadcast	60 to 75
Rye	Sep't. 1 to Nov. 1	1½ to 2 bus.	90 to 120
Vetch	Sep't. 1 to Oct. 15	1 bu.	90 to 120
For spring and summer planting.			
Alfafa	Feb. 25 to April 1	15 to 25 lbs.	75 to 90
Chufas	Mar. 15 to June 1	3 to 4 pks.	120 to 150
Cowpeas	May 1 to July 10	½ bu. drilled 1½ bu. broadcast	75 to 90
Japan clover	Mar. 1 to Mar. 15	24 lbs.	60 to 75
Oats	Feb. 1 to Mar. 20	1½ to 3 bus.	75 to 90
Peanuts	May 1 to June 30	1 to 2 bu. unhulled	90 to 120
Rape	Mar. 1 to Mar. 31	4 to 6 lbs. drilled 9 to 10 lbs. broadcast	60 to 75
Sorgum	April 1 to June 30	1½ to 2 bus.	60 to 90
Soy beans	April 1 to June 30	½ bu, drilled 1½ bu. broadcast	90 to 120

Through the use of these crops the expense of carrying the brood sows and boars through the year can also be

greatly reduced. Many of these crops would keep the sows in a fat condition without the use of any grain at all,—and it is the grain that costs the money in Alabama.

Another point is too often overlooked, but is of great moment to Southern soil maintenance, and should be considered in all cases where live stock is handled—the relation of live stock to soil fertility. The farmer who keeps live stock has a fertilizer factory upon his own farm. Stock will improve the soil to such an extent that poor soils can within a few years be made to produce a bale of cotton to the acre.

Producing hogs is an excellent method by which soils can be maintained and built up. In 1898 the Arkansas Station grazed hogs upon areas of peanuts, chufas, and soy beans. The two years following 1898 the land was planted in cotton and data was collected to determine what effect this grazing might have upon cotton yields. The results per acre were as follows:

Table 24. *Fertilizing effect of crops grazed by hogs*:

	Seed Cotton 1899	Seed Cotton 1900	Average yield seed cotton 1889-1900	Average per cent. increase in seed cotton due to grazing and growing the crop	Value of increase per acre each year (lint 11c. seed 60c)
Cotton following peanuts grazed by hogs.....	1771	1134	1452.5	61.1	$22.81
Cotton following soy beans grazed by hogs.....	1588	1020	1304.0	44.6	16.35
Cotton following chufas grazed by hogs	1200	981	1090.	20.9	7.68
Cotton following corn not grazed	1005	798	901.5	....	.....

The effect upon the soil of growing a legume and then grazing it off with hogs is remarkable; for instance in the case of soy beans and peanuts the increased yield of cotton was 44.6 per cent and 61.1 per cent respectively. The

effects of growing these crops and grazing them off does not stop with the cotton crop grown the first year following the grazing; the data show that the increase over the corn lot was still considerable in the second year.

Of course, in the case where peanuts and soy beans were used the increased cotton yields were not due entirely to the grazing; part of the benefits were due to the fact that the crops were legumes, thus placing nitrogen in the soil for the use of subsequent crops. But with chufa pasture we have a case in hand where the increased cotton yields could have been due to nothing except the grazing and the supplementary grain fed, as the chufa plant is not a legume. In this case the increased cotton yields for the average of the two years following the chufas, which had been grazed off, was 20.9 per cent over the cotton crops which had followed a corn crop without being grazed off by the hogs. That is, a farmer can expect to get more cotton when it is planted on an area where hogs have grazed or where peanuts, soy beans, or other legumes have been grown than he can secure from an area where hogs have not been grazed.