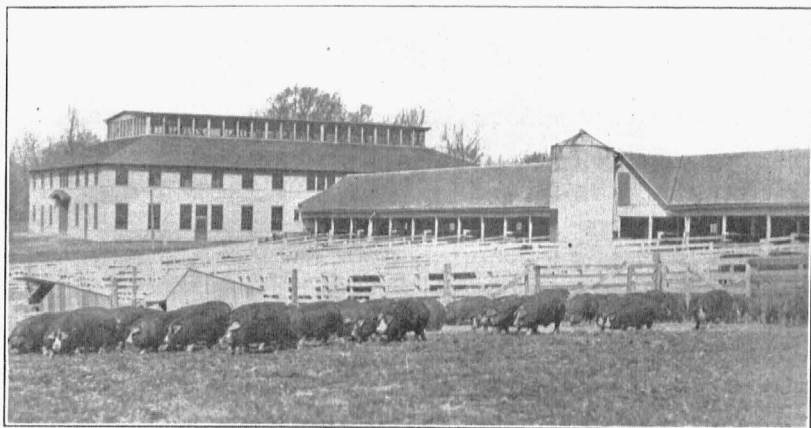


Pastures for Hogs

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Carload of hogs in the feedlots of the Missouri Agricultural Experiment Station.

The distinct advantages of a liberal use of forage crops for pork production have been definitely established by agricultural experiment stations and at the present time are well understood by the most successful swine feeders. These advantages may be briefly enumerated as follows:

1. Pigs fed on pasture require less grain or concentrated feed to produce 100 pounds gain than do those fed in the dry lot. The advantage which forage crops will have in this respect will vary considerably, depending upon the efficiency of the particular pasture used and to an even larger extent upon the amount of grain fed to the grazing pigs. A summary of the results of a number of experiments along this line show that this saving amounts to approximately 15% when full feeding with well balanced rations on both forage and in dry lot are compared, while if corn is the sole concentrate used then the saving may be as much as 50% or more. At the Missouri Experiment Station it has been shown that,

Note.—This circular is a summary of Missouri Agricultural Experiment Station Bulletin 247, April, 1927.

when the amount of grain fed to hogs on various kinds of pastures, was limited to the amount required to produce $\frac{3}{4}$ pound gain per 100 pounds live weight per day (one-half to two-thirds of a full feed), the saving in grain amounted to 38% as compared with dry lot feeding. As concentrated feeds become relatively high in price the significance of this saving is appreciated.

2. Hogs fed on pasture not only produce gains with less grain than when fed in dry lot, but gains are more rapid. When well balanced grain rations are used the increased rate of gain due to including pasture in the ration has been computed to be 37% while with corn alone the use of pasture increased the rate of gain more than 111%. These facts indicate that the succulent forage either increases the efficiency of those rations which are otherwise ordinarily considered well balanced, or feeding conditions on pasture are more conducive to the production of rapid gains. As a matter of fact increased gains are probably the result of both of these factors.

3. Forage crops reduce the amount of high-priced nitrogenous concentrates needed in order to get satisfactory gains. All pasture crops contain a liberal amount of protein and ash, the nutrients in which corn is deficient. Certain crops like alfalfa, clover and rape are especially valuable from this standpoint. Pastures, therefore, help to balance corn fed to hogs thereby decreasing the amount of feeds like tankage, linseed oil meal and shorts needed in the ration. This is true not only while the pigs are on pasture but there is evidence that, if they are fed for a time in dry lot at the end of the grazing season, the protein requirement will be less than for pigs which have not previously been on pasture.

4. In fact a residual effect may follow the use of forage crops as regards amount as well as kind of feed required to produce gains on pigs grazed through the summer and later fed out in dry lot. Gains made by such pigs while in dry lot may not only be more economical but also more rapid than gains of similar pigs which have not previously received forage. This was true two out of three years at the Missouri Station indicating that the beneficial effect of using forage through the summer may extend into a later period of dry-lot feeding if the hogs are not marketed at the end of the grazing season.

5. Feeding hogs on forage or pasture helps materially to maintain soil fertility. It is quite generally thought that in this respect hogs have less value than other kinds of livestock. This opinion is due to the fact that the manure produced by hogs is not properly utilized rather than because it has low fertilizing value. As a producer of fertilizer the hog stands at the top of the list of farm livestock. The important problem,

therefore, is one of saving the manure produced and this can best be done by feeding on pasture rather than in a small pen, barnyard, or on a bare hillside where the manure cannot be saved.

By feeding on forage crops it is possible under favorable conditions to recover 75% or more of the fertilizing value of the feeds consumed. In fact, where considerable grain produced elsewhere is fed to hogs on pasture, such areas may increase rather than decrease in productivity. For the last eighteen years crops grown on certain fields at the Missouri Agricultural Experiment Station have been pastured or hogged down by hogs to which additional concentrates have been fed. The yields of the various crops grown on the fields so handled have increased noticeably.

6. Hogs can be kept more thrifty and healthy if fed on pasture. Parasites, such as lice and worms, and all swine diseases are much more easily combated when the hogs have the range of pasture than when they run and feed on areas on which large numbers of hogs have been handled. This is particularly true if the pasture crop is one which has required that the land be cultivated recently.

Recognizing the importance of a liberal use of pasture crops for pork production and the special advantages which Missouri has in this connection due to a long grazing season and the ease with which specially adapted crops may be grown, the Missouri Agricultural Experiment Station as early as 1908 began extensive experiments along this line. These experiments have been continued without interruption and have resulted in the accumulation of valuable data on many important phases. These include (1) adaptability of various crops, (2) amount of grain to feed on forage, and (3) kind of grain or concentrate to feed.

ADAPTABILITY OF VARIOUS PASTURES

While pastures, in general, offer distinct advantages from a pork production standpoint, the different crops vary considerably in adaptability. In general it might be said that a crop, in order to be satisfactory for pasturing or hogging down with hogs, must (1) continue to grow as pastured, like alfalfa, clover, or rape, or (2) serve as a finishing crop, that is it must furnish nutrients in such large amounts and concentrated form that they will fatten or finish hogs for the market. Corn is of course the best example of a finishing crop for hogging down.

RELATIVE VALUE OF SOME HOG PASTURES

Forty-eight trials were conducted to determine the value of different pasture crops when measured in terms of pork produced per acre. Alfalfa was found to be the most productive, followed closely by the clovers (red, alsike, and sweet) and rape or a mixture of rape and oats. The

value of crops like sorghum and Sudan grass is found not so much in the total pork produced per acre as that they produce pork at a time when other pasture may not be available. Bluegrass is the best permanent pasture, while rye and wheat are of value for winter and early spring use. Soybeans and cowpeas produced less pork per acre than any of the other crops.

AVERAGE RESULTS OF 48 TRIALS AT THE MISSOURI AGRICULTURAL EXPERIMENT STATION

Kind of pasture	Days Pastured	Hogs per acre	Grain fed per 100 lbs gain	Gain accreted per a. of pasture	Value of pork produced per acre @ 8c
			<i>lbs.</i>	<i>lbs.</i>	
Alfalfa	163.	10.30	3.07	591.80	\$47.34
Red clover	129.80	11.50	2.93	449.10	35.93
Rape, oats and clover	104.60	13.82	2.74	479.00	38.32
Rape and oats	81.	17.49	3.16	398.37	31.86
Rape	81.61	22.85	2.98	394.57	31.56
Sorghum	86.5	15.00	4.00	275.00	22.00
Bluegrass	136.28	12.19	4.41	274.42	21.95
Soybeans	24.70	17.38	2.59	174.64	13.97
Cowpeas	31.69	12.91	2.91	149.36	11.94

AMOUNT OF GRAIN TO FEED ON PASTURE

A clear understanding of the relation of the amount of concentrate fed with pasture to economical production is of prime importance to the producer. Some of the questions which arise in this connection are: Is it necessary to feed any grain if good pasture is provided? If so how much? Will an allowance of one-fourth, one-half, three-fourths or a full feed of grain give the best results? If hogs are full fed should they be fed by hand or self fed?

As to the amount of grain to feed, it is not possible to make a general recommendation which will apply in every case, for there are a number of conditions which must be taken into consideration when making a decision regarding this point. Some of the more important factors influencing this are age and weight of the hogs, and the object in feeding, that is whether they are to be developed for breeding animals or for the pork market, and if for market whether it is the object of the feeder to get them to market as soon as possible, or to grow them first and then fatten them. The system of management, then, which is practiced on a particular farm, or at a particular time, may determine to a large degree the amount of grain to feed. There are, however, several more or less definitely determined facts which should help decide this point.

In the first place, experimental work at a number of different experiment stations has shown that the best forage crop is little more than a maintenance ration, so that it is seldom profitable to force hogs to live

on forage alone, unless the object is merely to maintain them, as might be the case with mature sows not pregnant or sows not suckling pigs.

Experimental work has also shown that when the grain ration is not limited, that is when the hogs are fed all the grain they will eat, a maximum of high-priced concentrates will be required to produce gains made while hogs are on pasture. Of course pigs fed a limited grain ration gained less rapidly than those full fed so that it takes longer to make the pigs marketable when the amount of grain is limited. Data on this point then indicate that the feeding of less than one-half of a full feed of grain is seldom if ever justified even on the best pastures.

While limiting the amount of grain fed to hogs on pasture will result in cheap summer gains, if this method of feeding is followed it is possible that the finishing period may be prolonged until the more expensive dry-lot feeding in winter may be required in order to get the hogs on the market, thereby losing what has been gained. In order to find out just what does happen when spring pigs are full fed on pasture as compared with feeding a limited amount of concentrate during the grazing season and finishing by feeding in dry lot when new corn was available, the Missouri Station fed out a carload of hogs by each of these systems of management.

Some of the important facts brought out from the study of the amount of grain to feed on pasture are stated briefly as follows:

1. Limiting the grain ration decreased the amount of concentrate required per pound gain produced while the pigs were on pasture.
 2. If the amount of grain was limited to one-half of a full feed, gains were slower and therefore spring pigs were of stock hog weights at the end of the grazing season and required a fattening period in dry lot.
 3. Because of this more expensive finishing period in dry lot, as many bushels of corn were required to make spring pigs reach a marketable weight as fat hogs, regardless of whether they were first grown rather than fattened on grass by limiting the amount of concentrate fed on pasture and later full fed in dry lot or whether they were full fed from weaning to market.
 4. Forty-seven days more time was required to make spring pigs reach a marketable weight when fed a limited grain ration on pasture than when full fed.
 5. The delay in time of marketing caused by the longer feeding period usually results in the hogs bringing a lower price since the price of fat hogs on the market as a rule declines from September to December.
- From the above it would appear that the principal advantage of feeding a limited amount of grain on pasture is due to the fact that when

so fed the amount of grain required to produce gains is reduced to a minimum while the pigs are on pasture. In order to utilize this advantage without having the disadvantages which usually accompany the practice of limiting the amount of grain fed on pasture, i. e. slow gains, long feeding periods, expensive finishing in dry lot and poor market, many feeders are having their pigs come earlier in the spring, mostly in February and early March.

The question then arises as to how these early farrowed pigs should be handled through the summer while on pasture. Should they be full fed or will the limited feeding of grain make more economical gains and still make it possible to market the hogs so fed before the end of the grazing season and without an expensive period of feeding in dry lot? If they should be full fed, is it best to self feed them, that is keep feed before them at all times, or hand feed by giving them what they will readily clean up twice a day?

An experiment conducted at the Missouri Station to help answer these questions gave the following results:

1. Early spring pigs reached a marketable weight and were marketed as fat hogs before the end of the grazing season when the amount of grain fed on pasture was limited to three-fourths of a full feed.
2. Less grain was required per 100 pounds gain when the grain was limited—390.56 pounds compared with 415.07 pounds when hogs were full fed by hand, and 443.76 pounds when self-fed.
3. Hogs fed three-fourths of a full feed required more forage than those on full feed.
4. Hogs fed three-fourths of a full feed on pasture made slower gains than those which were full fed—1.27 pounds per head per day compared with 1.60 pounds for the lot full fed by hand, and 1.65 pounds for the self-fed lot.
5. There was little difference between the rate of gain of the hogs full fed by hand and those self-fed.
6. The hogs full fed by hand made their gains on less concentrate than did those self-fed—415.07 pounds compared with 443.76 pounds.

KIND OF GRAIN TO FEED ON PASTURE

The kind of grain or concentrate to feed on pasture would naturally be determined to a certain extent by the character of the particular forage as well as the amount of grain which is fed. If the pasture is a nitrogenous one like alfalfa or clover, then a different concentrate is needed to furnish

a balanced ration than when a carbonaceous pasture like bluegrass or sorghum is used. Likewise if corn is fed on alfalfa and the amount of grain is limited, then the hogs might eat enough of the nitrogenous forage to balance the corn consumed, which might not be the case if corn is full fed. Taking the results of the earlier Missouri Experiments into consideration it might be said that if the amount of concentrate fed on pasture is limited, then corn alone will prove satisfactory on nitrogenous forages like alfalfa, clover, rape, soybeans, or cowpeas, while if the pasture be carbonaceous in character, such as bluegrass, sorghum, or Sudan grass, that some nitrogenous concentrate like tankage should be fed with the corn even though the amount of concentrate fed be less than a full feed. However, the amount of protein concentrate need not be as great as would be needed if corn alone was being fed in dry lot since even pastures like bluegrass furnish considerable protein, especially if young tender growth is being eaten. If, for example, a ration of 10 parts corn and 1 part tankage was a balanced one for dry-lot feeding then for feeding with a limited amount of corn on bluegrass, 1 part of tankage to 20 parts corn would no doubt be sufficient with the bluegrass consumed to balance the ration.

The more recent work of the Missouri Station having to do with the kind of concentrate to use when full feeding hogs on nitrogenous pastures has given the following results:

1. Corn alone did not prove a satisfactory concentrate for full feeding fattening pigs even on a nitrogenous forage.
2. A ration of equal parts corn and shorts produced more rapid gains than corn alone but was no more economical.
3. Corn and tankage produced more rapid gains and less feed was required to produce 100 pounds gain than when the ration was corn alone or corn and shorts.
4. Corn and tankage produced gains which were as rapid and as economical as when wheat by-products were added to the corn and tankage ration.
5. In general, corn and tankage was as satisfactory a ration as corn and skim milk, the former ration producing more rapid gains. In the Experiment reported in this bulletin 100 pounds of skim milk replaced or saved 13.7 pounds of corn and 4.4 pounds of tankage.
6. A ration of Blatchford's pig meal and corn produced gains at the same rate but more feed was required to produce a given gain than when corn and shorts were fed.
7. Pigs fed semi-solid buttermilk gained faster than those fed skim milk. A possible explanation of the fact may be that the skim milk was too bulky.

8. While both semi-solid buttermilk and ground, hulled oats increased slightly the rate of gain as compared with corn and tankage, their use increased the cost of gain out of proportion.

9. Semi-solid buttermilk proved to be 65% as valuable as tankage pound for pound when used as a complete substitute for tankage and 85% as valuable when used as a substitute for one-half of the tankage.

10. Corn and tankage produced more rapid gains than corn and dried buttermilk, and less feed was required to produce 100 pounds gain with the corn and tankage ration.

11. Garbage tankage did not prove a satisfactory substitute for animal (packing house) tankage. In fact, as used in experiments reported herewith, corn and the garbage product gave no better results than did corn alone.

12. In general in the three trials summarized herewith corn and tankage, or at times these feeds with a small amount of wheat by-products added, proved to be the most practical combination for full feeding pigs on pasture, if both rate and economy of gains be considered.

13. Hogs full fed a ration of corn 10 parts and tankage 1 part on alfalfa pasture made an average daily gain of 1.46 pounds per head while those fed a ration of 1 part tankage, with 20 parts of corn gained 1.42 pounds making approximately 5 pounds difference in the final weight of 65-pound pigs fed 98 days.

14. There was practically no difference in the total amount of feed required to produce 100 pounds gain with hogs on alfalfa pasture whether 1 part tankage was fed with 10 or 20 parts corn—350 pounds as compared with 355 pounds. Therefore, since twice as much of the high-priced protein concentrate was used in the one case as was used in the other, the ration of 20 parts corn and 1 part tankage was the more economical.