

# Oklahoma Agricultural Experiment Station

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## RATIONS FOR FATTENING HOGS.

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Though but a new state, Oklahoma stands well to the front in pork production. According to recent statistics she stands eleventh in order among the states according to the number of hogs raised with 1,588,000 head. And not only have we large numbers of hogs, the quality is also very fair in the majority of sections. The improvement of no other class of stock has received so much attention in this state as has the improvement of the hog. Though the horses and cattle are, generally, lacking in quality yet the quality of our hogs is almost equal to that of those in any of the older states. Of course there is still room for great improvement but our farmers deserve credit for what has already been accomplished and we do not doubt that they will continue in the good work so well begun. Wide awake men realize that with high priced corn it is impossible to make good profits by feeding inferior stock and so they raise the class of hogs that will produce the greatest returns. The hog that requires 800 pounds of corn for every 100 pounds of gain is not wanted if hogs can be secured that will produce the same gain for 500 pounds of corn or less.

But even with the best improved hogs, the largest profits are not assured unless they are properly fed and managed. Throughout

the corn belt, corn is the staple grain used in feeding hogs and it is usually the cheapest grain that we can use for this purpose. Yet when it reaches the price which has prevailed during the past season, only the most judicious feeding can be practiced if there be any hope of securing profitable returns.

Corn alone is not a good ration for hogs. The growing animal requires a certain proportion of muscle forming material along with the fattening nutrients of the food. From the farmer's standpoint, the important functions of the protein are the production of lean meat, tendons, wool, hair, and building up and maintaining the vital organs of the body. The carbohydrates and fats are used in the formation of fat and in the production of the heat and energy of the animal body. Corn is rich in the fat forming compounds but is deficient in protein and consequently the best results cannot be obtained by feeding it alone. Even when hogs are considered fairly well matured and are simply being fattened, experiments have demonstrated that better results are obtained by feeding a ration containing a higher percentage of protein than is contained in corn. Of course the price of the different food stuffs obtainable will influence the feeder in making his selection and there may be conditions, such as low priced corn and high priced protein concentrates, that would justify him in feeding a ration consisting entirely of corn.

During the summer months, there is probably no cheaper ration than corn and alfalfa pasture in the districts where alfalfa can be grown successfully. Even where alfalfa does not do well, there are other pasture crops such as wheat, rape, cowpeas, soy beans, etc., which are valuable adjuncts to corn. But many farmers may be so situated that they find it advisable to buy some commercial food to supplement corn in preference to growing pasture crops.

This Station has just completed a hog feeding experiment conducted for the purpose of determining the relative value of different food stuffs as supplements to corn. Thirty head of Duroc Jersey and Poland China hogs were selected and these were divided into six lots of five each. The hogs were divided as evenly as possible from the stand point of individuality and that of weight with the result that the several lots were quite uniform. Lot I consisted of four Duroc Jersey gilts and one Duroc Jersey barrow; Lot II—three Duroc Jersey gilts, one Poland China gilt, and one Duroc Jersey barrow; Lot III—three Duroc Jersey gilts, one Poland China gilt, and one Duroc Jersey barrow; Lot IV—four Duroc Jersey gilts and one Duroc Jersey barrow; Lot V—four Duroc Jersey gilts and one Duroc Jersey barrow; Lot VI—five Duroc Jersey gilts.

The hogs used in this experiment were apparently all good feeders and were in very fair condition at the beginning of the test. They were fed and cared for, as nearly as possible, under exactly the same conditions. They were confined in open lots 36 feet long by 12 feet wide, facing the south and having a closed shelter at the north end. During wet weather, the lots became quite muddy but this apparently did not affect the thrift of the hogs and all lots were muddy to the same degree.

The weighing was done every two weeks; the average weight for three successive days being taken as the correct weight for the second day.

The following rations were fed:

Lot I. Corn meal.

Lot II. 7 parts corn meal, 1 part Armour's meat meal.

Lot III. 11 parts corn meal, 1 part Armour's meat meal.

Lot IV. 4 parts corn meal, 1 part cottonseed meal; alternated every other two weeks by corn meal alone.

Lot V. Corn meal, alfalfa hay (ad libitum).

Lot VI. Corn meal, cowpea hay (ad libitum).

All the feed stuffs used in this test were of first class quality.

The meat meal was furnished by the Armour Packing Company, of Kansas City, and contained 60 per cent of protein.

The cottonseed meal was of fine quality and contained 43 per cent of protein.

Cowpea hay contains 16.6 per cent of protein.

Alfalfa hay contains 14.3 per cent of protein.

Corn contains only 10.5 per cent of protein.

The amount of cottonseed meal that was fed was based on the results of previous experiments carried on at this Station; it having been found that the largest amount that could be fed with safety was one-fifth of the ration for two weeks, then omitting the cottonseed meal entirely for the following two weeks, and alternating in this manner throughout the feeding period.

The hogs were fed all the grain that they would eat up clean. The alfalfa hay and cowpea hay fed to Lots V and VI were placed in racks at one end of the enclosures and renewed each day; that which was left from the preceding day being removed, weighed, and this weight deducted from the total amount fed. The hogs had access to drinking water at all times.

Table I.  
Weights and Gains (in pounds) of Each Lot for Each Period.

Lot		Period Ending					Total
		Feb. 4	Feb. 18	Mar. 3	Mar. 17	Mar. 31	
I	Weight	952	1030	1087	1085	1125	173
	Gain		78	57	-2*	40	
II	Weight	929	1073	1176	1304	1413	484
	Gain		144	103	128	109	
III	Weight	951	1105	1196	1302	1424	473
	Gain		154	91	106	122	
IV	Weight	953	1058	1131	1170	1198	245
	Gain		105	73	39	28	
V	Weight	950	1042	1102	1163	1235	285
	Gain		92	60	61	72	
VI	Weight	949	1038	1086	1146	1202	253
	Gain		89	48	60	56	

\* Loss

Table I is a record of the weights and gains of each lot for each period of two weeks and also the total gains made by each lot for the total duration of the experiment from February 4, 1908, to March 31, 1908. This table shows a wide variation in the gains made by the different lots. The hogs in Lot II made the largest total gain, 484 pounds, with the other lots standing in the following order: Lot III, 473 pounds; Lot V, 285 pounds; Lot VI, 253 pounds; Lot IV, 245 pounds; Lot I, 173 pounds. This makes a very poor showing for the hogs of Lot I which received only corn, while the gains made by the hogs in Lots II and III, which received meat meal in addition to the corn, were very satisfactory. It will be noticed by referring to the table that Lot I shows a loss of 2 pounds for the period ending March 17th.

Table II.  
Total Number of Pounds of Feed Eaten by Each Lot.

Kind	Lot I	Lot II	Lot III	Lot IV	Lot V	Lot VI
Corn Meal	1386	1855.88	1893.83	1382.4	1607	1547
Meat Meal		265.13	172.17			
Cotton Seed Meal				145.6		
Alfalfa Hay					142.5	
Cowpea Hay						285
Total	1386	2121	2066	1528	1749.5	1832

Table II shows a vast variation in the amount of feed consumed

by the different lots. Although all the hogs were fed as much as they would consume, the hogs in Lot I consumed only 1386 pounds while those in Lot II consumed 2121 pounds, a difference of 735 pounds. Lot IV stands second lowest in the amount of food eaten with a total consumption of only 1528 pounds. The hogs in Lot VI consumed twice as much hay as those in Lot V but somewhat less corn. The cowpea hay was relished very much.

Table III.

Pounds of Feed Eaten for 100 Pounds of Gain in Each Lot Each Period.

Period Ending	Lot I	Lot II	Lot III	Lot IV	Lot V	Lot VI
Feb. 18	630	367	344	420	542	602
March 3	774	562	508	660	868	1065
March 17	*	403	478	736	628	677
March 31	448	467	418	1136	482	677
For Entire Exp.	801	438	437	624	614	724

\* Loss.

By referring to Table III we notice a vast difference in the amount of feed required to produce 100 pounds of gain. In Lots II and III, the amount required was practically the same. On hogs of this age, an average of 100 pounds of gain for every 436 or 438 pounds of grain would be considered very good returns and certainly much better than the results obtained in the case of any other lot in this test. The hogs in Lot I, which received corn alone, made very extravagant gains when compared with those in Lots II and III. The hogs in Lot VI also required a large amount of feed for 100 pounds of gain but it must be remembered that a portion of this amount consisted of cowpea hay which, pound for pound, is a much cheaper food than corn. When we come to a consideration of the cost of producing 100 pounds of gain, Lot VI will make a somewhat better showing than in this table. A comparison of Lots V and VI would indicate that the hogs in Lot VI had consumed too much coarse food (cowpea hay) to insure the best results in fattening. While Lot VI did considerably better than Lot I, yet the hogs in Lot V required over 100 pounds less feed for 100 pounds of gain than those in Lot VI though they consumed only half the amount of coarse food (alfalfa hay). Alfalfa hay and cowpea hay have much the same feeding value with a slight difference in favor of cowpea hay so that the difference between Lots V and VI in economy of gains could not be due to any special virtue in alfalfa hay. Although a large proportion of the ration fed to hogs not being pushed for the market

may consist of roughage, such as cowpea hay, alfalfa hay, or pasture, the ration for finishing them should consist largely of concentrates.

Table IV.

Dry Matter Consumed and Gain (in Pounds) of Each Lot for Each Period.

Lot		Period Ending				Total
		Feb. 18	Mar. 3	Mar. 17	Mar. 31	
I	Dry Matter	417.35	374.85	233.75	152.15	1178.10
	Gain	78	57	-2*	40	173
II	Dry Matter	452.49	485.85	441.36	434.52	1814.22
	Gain	144	103	128	109	484
III	Dry Matter	451.54	443.75	432.77	435.33	1763.39
	Gain	154	91	106	122	473
IV	Dry Matter	380.84	409.7	247.85	370.3	1038.69
	Gain	105	73	39	28	245
V	Dry Matter	426.2	445.16	327.86	297.26	1496.48
	Gain	92	60	61	72	285
VI	Dry Matter	458.83	437.36	348.11	325.16	1569.46
	Gain	89	48	60	56	253

\* Loss

In Table IV we have reduced the amount of feed consumed to pounds of dry matter. This gives a more accurate basis for comparison as there is a varying amount of water in different food stuffs and this water has no nutritive value.

Although the hogs in each lot were fed all that they would consume throughout the experiment, we notice a very marked decrease in the amount of food consumed by those in Lot I for each successive period. We usually expect to find more or less of a decrease in the amount of food consumed as a fattening animal nears the finishing period but in the particular case referred to, the rate of decrease is greatly in excess of what would be considered normal. This fact is demonstrated when the amounts of dry matter consumed during each period by the hogs in Lot I are compared with the amounts consumed by the hogs in other lots. The differences evidenced in Table IV are directly due to the difference in physical condition and general health of the hogs in the various lots and the cause of this difference in physical condition was due to the respective rations fed. After the first two or three weeks of the experiment, the hogs in Lot I appeared to be in a rather unthrifty condition, their hair was dry and harsh, they appeared to be slightly constipated, and their

feces were drier and harder than they would be in the case of animals that were in first-class condition. These hogs also had poor appetites. In all of these respects, there was a marked difference between the hogs in this lot and those in Lots II and III which gave satisfactory results in every respect. These hogs were in excellent condition throughout the experiment and always had keen appetites at meal time. They ate larger amounts of feed than the hogs in the other lots and the following tables will show that they gave good returns for the food consumed. It will be noticed that the hogs in Lot IV, while they fall much below the hogs in Lots II and III, consumed more food and make considerably better gains than those in Lot I, thus showing that cottonseed meal improves a corn ration when fed according to the method used in this experiment. The hogs in Lots V and VI consumed more food and made better gains than those in Lots I or IV.

Table V.

Pounds of Dry Matter Consumed for 100 lbs of Gain in Each Lot Each Period.

Period Ending	Lot I	Lot II	Lot III	Lot IV	Lot V	Lot VI
Feb. 18	535	314	293	363	463	516
March 3	658	472	499	561	742	911
March 17	*	345	408	636	537	580
March 31	380	399	357	1323	413	581
Average	681	375	373	534	525	620

\* Loss.

Table V gives the amount of dry matter required to produce 100 pounds of gain for each lot for each period and also for each lot for the entire length of the experiment. The figures in this table show that for the period ending March 31st, Lot I made quite economical gains while the same lot shows a loss during the preceding period. At the time of the previous weighing, the hogs in this lot were not eating well and consequently were weighed on a light "fill" which resulted in showing a loss for that period when there was doubtless an actual gain and this gain is included with the gain for the last period. This table shows a marked difference in favor of Lots II and III which required practically the same amount of dry matter to make 100 pounds of gain. The average amount of dry matter required for 100 pounds of gain show that Lot VI required just 60.6 pounds less than Lot I, but though this difference is much less than in the case of the other lots, it means a good deal so far as profits are concerned and it must also be remembered, as has been pre-

viously mentioned, that the hogs in Lot VI consumed a considerable amount of cheap food (cowpea hay).

Table VI

Cost of 100 lbs of Gain in Each Lot Each Period.

Period Ending	Lot I	Lot II	Lot III	Lot IV	Lot V	Lot VI
Feb. 18	\$6.29	\$4.13	\$3.72	\$4.41	\$5.21	\$5.60
Mar. 3	7.73	6.20	6.19	6.60	8.39	9.91
Mar. 17	*	4.53	5.18	7.72	5.99	6.18
Mar. 31	4.47	5.24	4.52	11.35	4.59	6.14
Average	8.01	4.94	4.73	6.38	5.88	6.67

\* No gain during this period.

In computing the cost of 100 pounds of gain as shown in Table VI, the following values were attached to the different food stuffs used in the experiment:

Corn meal \$20.00 per ton                      Armour's meat meal \$40.00 per ton  
 Cottonseed meal \$25.00 per ton      Alfalfa hay \$10.00 per ton  
 Cowpea hay \$10.00 per ton

As is shown in Table VI, the hogs in Lot I made very expensive gains and yet this is, doubtless, no exaggeration of what takes place in many of the feed lots of the farmers who feed nothing but high priced corn. More economical gains are often made on corn alone but what has happened in this experiment is typical of what is likely to occur when hogs in confinement are being fattened on corn alone. In Table V, we noticed that Lots II and III required practically the same amount of dry matter to make 100 pounds of gain but in Table VI there is considerable difference between these two lots in the average cost of producing 100 pounds of gain. This is due to the fact that the hogs in Lot II consumed a larger proportion of meat meal than those in Lot III. These results would indicate that a ration consisting of one part of meat meal to eleven parts of corn gave practically the same results at a lower cost than a ration consisting of one part of meat meal to only seven of corn. But even the more expensive gains of Lot II were made at much lower cost than the gains of any other lot excepting Lot III and the cost of making 100 pounds of gain on Lot III was not much more than half of what it was in the case of Lot I. Relative to the cost of producing 100 pounds of gain, the various lots stand in the following order: Lot III, \$4.73; Lot II, \$4.94; Lot V, \$5.88; Lot IV, \$6.38; Lot VI, \$6.67; Lot I, \$8.01.

The Experiment Station is beginning an experiment in which the same rations as were used in this trial will be fed to young growing shoats.