

Restricting Feed Intake To Growing-Finishing Swine

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The practice of restricting the feed intake of growing-finishing pigs has been followed by European producers for many years. This is done to tailor the carcasses produced to the exacting requirements of their pork carcass standards for Wiltshire sides and for very lean cured pork cuts, such as ham. It is also claimed that some improvement in feed efficiency is accomplished by limiting the feed intake to 80-85 percent of the amount that would be consumed if the same ration was self-fed.

Much interest has been shown in the limited feeding of growing-finishing pigs in this country in recent years. Several mechanical devices have been developed and placed on the market to deliver measured quantities of feed to groups of pigs at variable intervals. The results of research in this country on the limiting of feed to growing-finishing pigs vary a great deal. Some report favorable results both from the standpoint of improved carcass leanness and improved feed efficiency. Others report increased feed requirements per unit of grain as well as unfavorable results from a carcass standpoint, particularly in terms of dressing percentage.

It is visualized that a successful scheme to limit the feed intake of growing-finishing pigs must meet the following requirements.

1. It must limit the feed intake of pigs in relation to the need for limitation, that is the tendency to fatten. Those that tend to become excessively fat should be restricted most.

2. It must become more restrictive as the pigs become older and heavier and tend to lay on more finish.

3. It must permit some variation in daily feed intake in relation to the pig's desire to eat and to his need for body heat. This point applies particularly under conditions where environmental temperatures are subject to considerable variation.

4. It must permit each pig in a pen an opportunity to eat without having to fight the others to get his share. If this requirement is not met the boss pigs are limited only to a slight degree and the weaker ones too much. Under such conditions the pigs in a group become less uniform in size and finish as they approach market weights. The goal should be to make the pigs in a group more uniform by limiting the finish on those with the greatest tendency to fatten.

5. The degree of restriction and the ration formulation should be such that the necessary nutrients for maximum bone and muscle growth will be provided with little excess energy for storage as body fat.

6. It must be an inexpensive piece of equipment that requires very little daily attention.

To meet the above requirements a simple arrangement was made by placing regular two-hole self-feeders at the top of a series of steps in such a way that the pigs had to stand in an inclining position to eat. The steps used in this study required the pigs to stand at an angle of about 56 degrees. This is about as steep an angle as a market weight pig can stand on long enough to eat a reasonable amount. It was thought that this arrangement would require a certain relationship between physical strength and the weight of the animal. This might be interpreted as being between muscle and finish. It was hoped that the small framed pig with a strong tendency to fatten would become tired and retreat from the feeder before consuming as much as he would have if standing on a level floor. On the other hand it was hoped that the "athletic type" pig could hold himself in this position long enough to eat nearly as much as he would have if standing on a level floor. The relationship between strength and weight should bring about greater restriction of feed as the animal became heavier. A sketch of the equipment used appears below.

PROCEDURE

Pigs of Hampshire and Yorkshire breeding were used on these trials. Those on test from July through October were fed three to the pen. In the second trial (November-February) the pigs were fed in pairs. Within replicates the pigs were allotted on the basis of breed, sex, weight, sire and general appearance. Weight differences within each replicate were small, while sex and sire differences were balanced as well as possible. There were, however, considerable weight differences among replicates. Water was supplied by an automatic system.

The pens were about 7 X 7 feet and were located in a large barn which was relatively cool in summer and not real cold in winter. Temperature conditions were not recorded.

The same type-two-hole self-feeders were used in all pens. In the one case it was placed on the floor in the ordinary position, in the other it was placed at the top of a set of stair steps as indicated above.

The platform on which the feeder was placed was perforated with a series of one-half inch holes to allow all of the spilled feed to drop into a drawer below. Feed collected in the drawer was returned to the feeder. By this means feed wastage was held to a minimum.

As the individual pigs reached a weight of 200 pounds they were removed at weekly intervals and taken to the university meat laboratory for slaughtering and processing. The usual carcass measurements were made, plus specific gravity and a chemical analysis of the soft tissue of the right side of the carcass produced in the first trial.

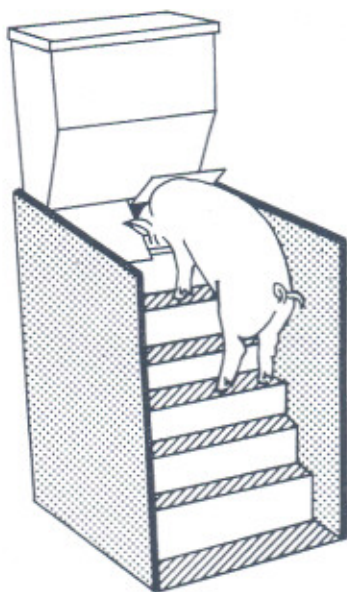


Figure 1. With this platform feeder pigs could eat whenever they wanted to, but to do so had to climb and stand in an inclining position on a ramp.

A milo-soy type ration containing 16 percent protein was fed throughout the trial. The usual change to a 14 percent protein ration as the pigs reached 120 pounds was not followed because of the difficulties involved in getting the changes made at the proper time. The ration used is shown in table 1.

Table 1: Ration Fed

Ingredients	Percentage	Per Ton
Milo-Western Yellow, No. 1 (Ground)	76.5	1530.0
Soybean Meal (50%)	15.9	318.0
Alfalfa Meal (17% Dehy.)	5.0	100.0
Calcium Carbonate	0.8	16.0
Dicalcium Phosphate	1.0	20.0
Trace Mineral Salt	0.5	10.0
Vitamin—Antibiotic—Trace Mineral Per Mix	0.3	6.0
Total	100.0	2000.0

RESULTS AND DISCUSSION

The results of this test are summarized in table 2. Daily feed consumption was reduced from 6.44 to 5.23 pounds, a reduction of 1.21 pounds or 18.8 percent. This reduction in daily feed intake was accompanied by a significant reduction in rate of gain from 1.87 to 1.58 pounds, a drop of 0.29 pounds daily or 15.5 percent. Previous work has shown

Table 2: Summary of Results

Lot No. Treatment Standing Position Rate of Feeding	I Self-Fed Level Floor Unlimited	II Self-Fed 56 Degrees Limited
<i>Production Data</i>		
Number of Pigs	50	47
Initial Wt. (Lbs.)	66.6	66.3
Final Wt. (Lbs.)	204.5	202.0
Av. Gain (Lbs.)	137.9	135.7
Days on Feed (Lbs.)	75.0	90.5
Av. Daily Gain (Lbs.)	1.87	1.58
Av. Daily Feed (Lbs.)	6.44	5.23
Feed Efficiency (Lbs.)	3.51	3.38
Feed Cost		
<i>Carcass Data</i>		
Chilled Carcass Wt. (Lbs.)	141.4	140.7
Dressing Percentage	69.1	69.6
Specific Gravity of Carcass	1.046	1.051
Loin Area (Sq. In.)	4.01	4.33
Backfat Thickness (In.)	1.42	1.32
Ham Percentage (L.W.)	14.3	15.0
Loin Percentage (L.W.)	12.2	12.4
Ham-Loin Percentage (L.W.)	26.5	27.4
Lean Cut Percentage (L.W.)	40.4	41.8

that a reduction of at least 0.20 pounds per day is required to have a significant influence on carcass composition. Pigs on the lower daily feed intake required 15.42 days longer to reach slaughter weights. The full-fed pigs average about 155 days of age when slaughtered and the restricted group about 170 days.

Feed efficiencies of 3.51 and 3.38 were obtained. This difference of 0.13 pounds or 3.7 percent in favor of the restricted group is not statistically significant. If one figures the complete ration at \$2.90 per hundred the feed costs would amount to \$10.21 and \$9.80 for the full-fed and restricted groups respectively. This difference in feed cost of \$0.39 per hundred may be offset against the additional time required and equipment used by the limited fed pigs. On the 136 pounds gain made by each pig this amounts to \$0.48 per head or a little over three cents per day for the fifteen additional days required.

The influence of the treatments on the composition of the resulting carcasses is also indicated in table 2. All carcass calculations are based on the weights off feed. Considering full weights on the live hogs and a 24 hour shrink on the carcasses dressing percentages of 69.1 and 69.6 were obtained. These dressing percentages seem low in relation to those obtained after marketing shrinkages are absorbed. On the basis of live weights taken just prior to slaughter, after 14 hours without feed, and hot carcass weights the dressing percentages would have been in excess of 72.0 percent. In either case, the dressing percentage of the limited-fed group slightly exceeded that of the full-fed group.

All of the physical measurements of carcass composition used indicated that the limited-fed pigs were slightly leaner. Differences between the treatments with regard to backfat thickness, loin area, percent ham and percent lean cuts were all statistically significant. Loin percentage did not differ significantly between groups. Under the experimental design used it is not possible to separate the influence of limited feeding with the resulting longer time required to reach slaughter weights and the influence of the additional exercise required of the pigs standing in the inclining position.

From the standpoint of backfat thickness, 84 percent of the carcasses from full-fed pigs carried 1.6 inches of backfat or less and would have met this requirement for No. 1 carcasses. Several others were close to the maximum backfat. Ninety-six percent of the limited fed group met these standards. Thus if one were working with hogs on the borderline between No. 1 and No. 2 it appears quite likely that such a scheme as described herein could be used effectively in increasing the percentage of No. 1 carcasses. On discriminating markets this could be worth while.

The improvement in lean cut yields as a percentage of live weight of 1.4 percent might also be given a value. At present market prices each percentage change in lean cut yields is worth about \$0.20 per hundred on the live hog. Thus, the limited fed group would actually be worth about \$0.28 per hundred or \$0.56 more per head than the full-fed group. This value coupled with the \$0.48 saving per head in feed cost amounts to \$1.04 greater difference between feed cost and market value in favor of the group receiving the lower daily feed intake. With some modification, this scheme could be made to restrict feed intake further if such was desired. Its adaptation to commercial practice would be very simple if market demands require a leaner carcass. One should remember that average market hogs yield about 33 to 34 percent of their live weight in the four lean cuts if processed under conditions of this experiment. The full-fed group yielded 40.4 percent, a full 6.0 percent above the average market hog. Restricted feeding moved this figure up an additional 1.4 percent to a total of 7.4 percent above the average market hog. To make limited feeding practical these differences must be recognized at the market.