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## HOG FEEDERS?

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### Summary

During the past 6 yr, extensive research has been conducted at KSU to evaluate feeding systems and various types of wet and dry feeders. Comparisons have been made between timed-feeding and ad libitum feeding systems using dry or wet feeders. Timed-feeding did not improve pig performance (ADG, F/G) when compared with ad libitum dry feeding. Wet feeding in most of the trials resulted in approximately 5% improvement in both average daily gain and feed efficiency. Feeding hogs with an oval or rectangular dry feeder resulted in similar pig performance. All feeders were easily adjusted to reduce feed wastage to a minimum.

The title of the presentation that I was assigned is "What's New in Swine Feeder Technology." That title would suggest that some dramatic changes have taken place in hog feeder design that has revolutionized the swine industry. I wish that were true! In the last few years, some new feeders and feeding systems have been developed that offer an alternative to ad libitum dry feeding of finishing swine.

However, the basics of a hog feeder have somewhat remained the same. Producers usually list these desirable characteristics of a good feeder: (a) durable; (b) easy to adjust, (c) no feed wastage, (d) easy to clean, (e) will hold a certain increment of feed, and (f) repairable. Manufacturers have made improvements in increasing durability by using stainless steel, plastics, and fiberglass to reduce rusting. Top-adjusting feeders are very common today, permitting easy adjustment of the flow of feed to the pigs. Producers tend to adjust feeders more correctly if the adjustment is easy, and this reduces feed wastage. A research study at West Virginia several years ago showed that some feeder types wasted up to 23% of the feed put in them. No one can tolerate feed wastage in growing finishing pigs and expect to remain competitive in the swine industry. Ease of cleaning has been improved with the new materials that are being used to manufacture feeders. Repairability of feeders seems to be less important as we use the new type feeders, but certainly if adding lids, rods, bottoms, etc. can be accomplished, it helps to preserve the life of the feeder.

Several new feeding systems have become available to swine producers during the past 5 yr. Two of the alternatives were meal-time feeding and wet feeding of hogs. Consequently, the KSU research team decided to evaluate the growth performance of finishing hogs (100 lb market weight) using various wet feeders, dry feeders, and meal-time feeders.

In 1982, three feeding trials were conducted to evaluate meal-time feeding versus ad libitum feeding. The meal-time fed pigs were offered feed during two 3 hr periods per 24 hr with water available for four 3 hr periods. The meal-time feeder (Chore-Time®) was compared to a rectangular (Pride of the Farm®) and an oval feeder (Osborne®). Growth rate and feed required per pound of gain were similar for all treatments. Pigs fed ad libitum did have significantly more backfat (1.23 vs. 1.01 in.) than meal-fed pigs. Growth rate and feed efficiency were similar when the rectangular feeders were compared to oval feeders for ad libitum feeding of finishing hogs (Tables 1 and 2).

In 1983, we expanded our interest by conducting two trials to evaluate meal-time, dry, and wet feeders. Growth rate was improved 5% by ad libitum wet feeding when compared with meal-feeding and ad libitum dry feeding. Feed efficiency was similar for all three feeding systems (Table 3).

In 1984, another trial was conducted to evaluate two different wet feeders and two dry feeders. The feeders used for wet feeding were a rectangular wet feeder (Aqua<sup>®</sup>) and a dry feeder (Pride of the Farm) modified with a water manifold above the feeding troughs. Feed was moistened in the latter feeder by the water that drooled from the pig's mouth as it took a drink. The Aqua feeder required the pigs to moisten feed or create a pool of water in the feed to obtain water needs. In this trial, the growth rate and feed efficiency of the pigs were improved (5%) by wet feeding. All pigs fed with the dry feeders performed similarly. Likewise, pigs fed with the wet feeders performed equally, regardless of type of wet feeder (Table 4).

An additional trial was conducted in 1984 to further compare dry vs. wet ad libitum feeding and timed feeding. The timed-fed pigs had either ad libitum water or time-restricted water. Finishing pigs on time-restricted feeding with ad libitum water gave significantly depressed average daily gain and daily feed intake. It was postulated that those pigs fed on a time-restricted basis, but with water ad libitum, were stimulated to drink more water in an attempt to suppress their hunger. As a result, some pigs would be partially satiated when they finally gained access to the feeder and thus consumed less feed.

In this trial, feeding behavior was observed for pigs being fed meals versus ad libitum. In the time-fed pens, 70% of the pigs were lying down with very little activity around the feeder before the system began to operate. When the feeder system started to feed, 60% of the pigs began feeding during the first 15 min and only 5% required longer than 60 min to get to the feeder for the first time. Feeding behavior in ad libitum-fed pigs was predominantly during the daytime hours. Reduced feeding activity was observed at nighttime, despite the fact that the building lights were on 24 hr. The frequency of feeding and duration of feeding bouts differed significantly among treatments. Ad libitum-fed pigs eating dry feed were observed more frequently at the feeder and had longer feeding bouts than ad libitum-fed pigs eating wet feed. Another observation was that the round feeder used with the dry feed allowed pigs to move about the feeder in a circular motion without leaving, even when competition for space at the feeder occurred.

In this past year, another study (see page 60 of this report) was conducted to evaluate wet vs. dry ad libitum feeding of growing finishing hogs. This study used the Pride of the Farm Maxima<sup>®</sup> feeder. Contrary to earlier advantages sighted for wet feeding, this trial resulted in equal pig performance for average daily feed intake, average daily gain, and feed efficiency.

To maximize performance of finishing hogs, another area of research that we have tried to evaluate is the reduction of boredom during the finishing period. The sorting of pigs by aggressive behavior resulted in a big improvement of the submissive pigs in average daily gain. Random sorting had no effect on subsequent performance. Sorting by weight resulted in the lighter pigs gaining faster during the following 4 wk in trial 1, but the opposite was true in trial 2.

Table 1. Performance of Finishing Pigs Fed Ad-Lib or Meals

Trait	Average daily gain, lb	Average daily feed intake, lb	Feed/gain
<u>Trial 1<sup>x</sup></u>			
Meal time (4 pens)	1.88	6.08	3.22 <sup>b</sup>
Ad lib, rectangular (2 pens)	1.90	5.89	3.10 <sup>a</sup>
Ad lib, oval (2 pens)	1.86	5.79	3.10 <sup>a</sup>
<u>Trial 2<sup>y</sup></u>			
Meal Time (4 pens)	1.54	5.32	3.43
Ad-lib, rectangular (2 pens)	1.56	5.44	3.48
Ad-lib, oval (2 pens)	1.54	5.32	3.44
<u>Trial 3<sup>z</sup></u>			
Meal time (4 pens)	1.48	5.68	3.84
Ad-lib, rectangular (2 pens)	1.50	5.85	3.90
Ad-lib, oval (2 pens)	1.51	5.92	3.93
<u>Summary-3 Trials</u>			
Meal time (12 pens)	1.63	5.69	3.50
Ad-lib (12 pens)	1.64	5.70	3.49

<sup>x</sup>20 pigs per pen, initial weight 119 lb, final weight 236 lb, 62-day trial.

<sup>y</sup>20 pigs per pen, initial weight 116 lb, final weight 220 lb, 68-day trial.

<sup>z</sup>20 pigs per pen, initial weight 118 lb, final weight 205 lb, 58-day trial.

Table 2. Effect of Feeder-Type on Performance of Growing-Finishing Pigs

Item	Feeder Type	
	Rectangular	Oval
No. Pigs	64	64
No. Pens	8	8
Avg intitial weight lb	85.0	84.4
Avg final weight, lb	217.9	213.0
Avg daily gain, lb	1.58	1.53
Avg daily feed intake, lb	4.63*	5.00
Feed/gain	2.93	3.09

\*P = .02

Table 3. Performance of Finishing Pigs with Three Feeding Systems

Trait	Avg daily gain, lb	Avg daily intake, lb	Feed/gain
<u>Trial 1<sup>a</sup> (2 pens/treatment)</u>			
Meal-fed	1.50	5.75	3.84
Ad lib, dry	1.48	6.06	4.09
Ad lib, wet	1.62 <sup>c</sup>	6.34	3.94
<u>Trial 2<sup>b</sup> (2 pens/treatment)</u>			
Meal-fed	1.52	5.86	3.85
Ad lib, dry	1.57	5.58	3.56
Ad lib, wet	1.57	5.91	3.71
<u>Summary: (4 pens/treatment)</u>			
Meal-fed	1.51	5.80	3.84
Ad lib, dry	1.52	5.82	3.82
Ad lib, wet	1.59	6.12	3.83

<sup>a</sup>20 pigs/pen, intake weight = 118 lb, final weight = 201 lb, 54-day trial.

<sup>b</sup>20 pigs/pen, initial weight = 103 lb, final weight = 212 lb, 70-day trial.

<sup>c</sup>Different from other two treatment groups (P<.05).

Table 4. Performance of Finishing Pigs Fed Wet or Dry Diets<sup>c</sup>

Feeder	Pride <sup>®</sup> Dry	Osborne <sup>®</sup> Dry	Pride Wet	Aqua <sup>®</sup> Wet
Initial wt, lb	104.3	105.5	104.2	102.9
Final wt, lb	236.3	236.0	240.6	242.9
ADG, lb	1.78 <sup>a</sup>	1.76 <sup>a</sup>	1.84 <sup>b</sup>	1.89 <sup>b</sup>
ADFI, lb	6.56	6.34	6.42	6.56
Feed/gain	3.68 <sup>a</sup>	3.60 <sup>ab</sup>	3.48 <sup>b</sup>	3.47 <sup>b</sup>

<sup>ab</sup>Means on the same line with different superscripts differ significantly (P<.05).

<sup>c</sup>25 pigs/pen; 2 pens per treatment; 74-day trial.

Table 5. Performance Comparison of Finishing Hogs Fed by Various Feeding Systems

Feed	Water	ADG, lb	ADFI, lb	F/G
Ad lib Wet	Ad lib	1.62 <sup>a</sup>	6.34 <sup>a</sup>	3.94
Ad lib Dry	Ad lib	1.48 <sup>a</sup>	6.06 <sup>ab</sup>	4.09
Timed	Ad lib	1.28 <sup>b</sup>	5.43 <sup>c</sup>	4.26
Timed	Timed	1.50 <sup>a</sup>	5.75 <sup>bc</sup>	3.84

<sup>abc</sup>Means with different superscripts differ (P<.05).