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It has been established at this and other research stations that more desirable reproductive performance can be obtained in limit feeding pregnant females as compared to ad libitum feeding. There has been considerable interest in various methods of feeding in order to make the most efficient use of labor and equipment. This experiment was designed to study reproductive performance of gilts and sows interval fed two typical and yet considerably different gestation rations.

Procedure

The experiment involved two trials, one in the winter of 1968-69 and one in the summer of 1969. In each trial, equal numbers of first litter gilts and equal numbers of aged sows were allotted to each ration treatment. They were allowed access to self-feeders for two hours on Monday, Wednesday and Friday. No additional feed was available. The composition of the two experimental diets is shown in table 1.

Winter Trial

Two pens of sows and two of gilts were used in the winter trial. Twenty sows and 26 gilts were allotted to treatment outcome groups after about the third week of gestation on the basis of weight and ancestry. Weight gain and feed consumption were recorded from the initiation of the trial until three days before the first sow farrowed and then the records were terminated. The number of pigs, both live and stillborn, was recorded at farrowing. Weights were obtained on all pigs on the day they were born.

The results of the winter trial are shown in table 2.

Sows

The sows consumed approximately the same amount of feed regardless of diet (5.7 and 5.8 lb. for diets A and B, respectively). However, the sows receiving the higher energy diet, diet B, consumed about 25% more calories of metabolizable energy than did the sows receiving the bulky diet, diet A, and gained an average of 5 lb. more during the gestation period. Sows on the high energy diet farrowed an average of one more live pig per litter (12.3 vs. 11.3) and averaged 0.5 more stillborn pigs per litter than sows fed the bulky diet. Pig birth weights were similar resulting in slightly greater total litter weights by sows fed the high energy diet because of larger litters.

Gilts

The gilts receiving the high energy diet consumed approximately 29% more feed than those fed the bulky ration, 3.4 and 4.4 lb. per day, respectively. With the additional feed consumed and the higher energy content of the diet, gilts consuming diet B averaged 6,349 Kcal. M.E. (metabolizable energy) per day while those receiving the bulky diet consumed an average of 3,722 Kcal. M.E. per day. The energy consumed by the gilts fed the bulky ration was less than the National Research Council's recommended level for bred sows. However, these gilts did gain an average of 35 lb. during gestation while those gilts consuming the higher energy ration lost an average of 9 lb. The reason for this is difficult to explain, but it should be noted that an extreme amount of snow and several storms and cold weather occurred during this trial.

Gilts receiving the bulky ration farrowed an average of 9.8 pigs per litter or 22% more live pigs than the 8 pigs per litter farrowed by the gilts fed the higher energy ration. More stillborn pigs were also farrowed by gilts fed the bulky ration. Pig birth weights were similar, but slightly heavier, for pigs from gilts fed the bulky ration.

Summer Trial

Two pens of sows and two pens of gilts were used in the summer trial and handled the same as in the winter trial. Twenty-six sows and 18 first litter gilts were placed on test in the third week of gestation. As in the previous trial, weight gain and feed consumption were recorded during gestation. At farrowing, sow weight loss was measured by weighing the sow just before and just after farrowing. The number of live pigs, stillborn pigs, and mumified pigs were observed. Pig birth weight was obtained on the newborn pig before it was allowed to nurse. Gestation length and time required to farrow were recorded.

The results of the summer trial are shown in table 3.

Sows

During the summer trial, sows fed the high energy diet consumed more feed than did the sows fed this ration during the winter trial, while the bulky ration was consumed in similar amounts during winter and summer. Thus, approximately 45% more feed was consumed by the sows fed diet B during the summer compared to those fed diet A and gestation gains averaged 98 and 43 lb. for sows fed diets B and A, respectively.

Sows consuming the high energy diet farrowed an average of 2.1 more live pigs per litter (11.7 as compared to 9.6) and had fewer stillborn and no mumified pigs. Sow weight loss during parturition and gestation length were similar between treatments. The average length of time required for farrowing was 6.1 hours for sows fed the high energy diet and 4.4 hours for those receiving the bulky diet. This increased farrowing time may be associated with the larger litters farrowed by those sows.

Gilts

Similar to the winter trial, the gilts receiving the high energy diet consumed about 30% more feed than those receiving the bulky diet. Average consumption of both diets was approximately 0.4 to 0.6 lb. per day more than during the winter period. However, gestation gain was considerably increased during the summer with gilts fed the high energy diet gaining 118 lb. and those fed the bulky ration gaining 61 lb. This difference is probably largely due to the difference in maintenance requirements during winter and summer periods.

Unlike the sows, gilts fed the bulky diet farrowed more live pigs than gilts receiving the high energy diet, 10.8 and 9.9 pigs, respectively. This is in agreement with the farrowing results of the winter trial where a similar difference was noted. Gestation length was about one day shorter and farrowing time approximately two hours longer for the gilts fed the bulky diet.

Summary

Using the interval feeding method, two hours per day on Monday, Wednesday, and Friday, 46 sows and 44 first litter gilts were fed two different gestation diets differing in energy content. Trials were conducted in both the summer and winter seasons. In both trials, sows receiving the high energy diet gained more weight during gestation and farrowed more live pigs. During the winter trial no difference in feed consumption due to treatment was observed. However, in the summer trial sows receiving the high energy diet consumed more feed daily than those receiving the bulky diet.

Results from the gilts were considerably different than those of the sows indicating possible differences in requirements under these conditions. During both trials gilts consumed about 30% more of the high energy diet than of the bulky diet. However, in the winter trial these gilts actually lost weight while those eating less of the bulky diet gained weight. During the summer trial both groups gained weight with those fed the high energy diet gaining the most. In both trials more live pigs were farrowed by the gilts receiving the bulky diet.

Table 1. Composition of Diets

Ingredient	A	B
Ground corn	30.0	79.0
Soybean meal (44%)	8.5	18.5
Dehydrated alfalfa meal	30.0	--
Ground oats	30.0	--
Dicalcium phosphate	1.0	0.9
Limestone	--	1.1
Trace mineral salt	0.5	0.5
Vitamin premix[a]	+	+
	100.0	100.0
Calories of metabolizable energy per lb. of feed	1,083	1,443

[a] Supplied the following per ton of diet: 30 million I.U. of vitamin A, 2 million I.U. of vitamin D_2, 30 gm. of riboflavin, 120 gm. of pantothenic acid, 160 gm. of niacin and 100 mg. of vitamin B_{12}.

Table 2. Results of Winter Trial

Treatment	Sows		Gilts	
	A	B	A	B
No. of animals	6[a]	6[a]	10[b]	11[b]
Av. init. wt., lb.	451.5	468.3	304.3	321.3
Av. final wt., lb.	467.3	488.5	339.8	312.5
Av. wt. gain during gestation	15.8	20.2	35.5	-8.8
Av. no. live pigs born	11.3	12.3	9.8	8.0
Av. pig wt., lb.[c]	3.2	3.3	3.0	2.8
Av. no. stillborn pigs	0.8	1.2	1.2	0.5
Av. daily feed consumed through gestation, lb.	5.7	5.8	3.4	4.4
Calories of M. E. consumed per day	6,173	8,369	3,722	6,349

[a] Ten sows started on each treatment but only 6 in each case were settled. Feed consumption is based on all ten.

[b] Thirteen gilts started on each treatment but only 10 and 11 on treatments A and B, respectively, were settled. Feed consumption is based on all 13.

[c] Weighed within first day of birth.

Table 3. Results of Summer Trial

	Sows		Gilts	
	A	B	A	B
No. of animals	13	13	8[a]	8[a]
Av. init. wt., lb.	363.2	391.1	297.4	302.6
Av. final wt., lb.	406.2	489.6	358.5	420.3
Av. wt. gain during gestation	43.0	98.5	61.1	117.7
Av. no. live pigs born	9.6	11.7	10.8	9.9
Av. pig wt., lb.[b]	2.6	2.5	2.4	2.7
Av. no. stillborn pigs	0.5	0.1	0.3	0.1
Av. no. mumified pigs	0.4	0.0	0.0	0.1
Av. sow parturition wt. loss, lb.[c]	40.8	42.5	31.6	32.7
Length of farrowing interval, hr.	4.4	6.1	6.3	4.5
Gestation length, days	113.7	112.9	113.5	114.6
Av. daily feed consumed through gestation, lb.	5.3	7.7	3.8	5.0
Calories of M. E. consumed per day	5,740	11,111	4,115	7,215

[a] Nine gilts started on experiment in each treatment. However, one died at parturition in each treatment and the data eliminated. Feed consumption is for all nine gilts.
[b] Birth wt. were taken on newly born dry pigs before nursing.
[c] Sows weighed immediately before and after parturition before pigs nursed.