

CREEP FEEDS

for Suckling Pigs

*The Effect of Oat Hull Fiber,
Sugar and Pelleting*

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**OHIO AGRICULTURAL
EXPERIMENT STATION**

WOOSTER, OHIO

CONTENTS

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The Substitution of Finely Ground Clipped Oats for all or a Portion of the Oat Groats in a Pelleted Creep Feed	4
The Inclusion of Cane Sugar in Pelleted Creep Feeds	10
Cane Sugar Added as a Coating to Pelleted Creep Feeds	13
The Inclusion of Cane Sugar in Creep Feeds Fed in Meal Form	16
Meal Versus the Pelleted Form of a Creep Feed	19
Summary and Conclusions	22

CREEP FEEDS FOR SUCKLING PIGS

The Effect of Oat Hull Fiber, Sugar and Pelleting

H. S. TEAGUE and R. F. WILSON

Creep feeding allows the suckling pig to obtain nutrients, in addition to sow's milk, needed for optimum growth. Because the amount of sow's milk consumed is not an exact quantity, formulated creep feeds are designed to be nutritionally complete and not to supply only the pig's needs in addition to sow's milk. Palatability is an essential characteristic of a good creep feed.

The kind, amount and physical form of many feed ingredients appear to influence the consumption of feed by the suckling pig. The experiments being reported are where the effect of including corn or cane sugar, the sugar coating of a pelleted feed, including different levels of oat hull fiber and the comparative feeding value of the meal or the pelleted form of certain creep feeds were observed.

Some experiments dealing with the influence of pelleting and the addition of sugar to creep feeds were conducted at Ohio State University in Columbus. Presentation of these results is intended to supplement the information obtained at the Experiment Station. There was no attempt to standardize experimental conditions at the two locations.

Litters used in trials at the Ohio Agricultural Experiment Station were farrowed in the Station herd and consisted largely of purebred Durocs with some crossbred pigs of Yorkshire and Duroc breeding. The trials were conducted in pasture lots of approximately one acre in size. From 4 to 7 sows and their litters comprised each lot and the pigs from these litters were treated as an experimental group. Each lot was provided with a paneled creep feeding area and a waterer. Wooden platforms were placed beside self feeders to make the feed more accessible and provide a cleaner feeding area. The composition of the creep feeds, all of which were formulated to contain 18% crude protein, is shown in Table 14. The pigs were weighed at the beginning and end of the creep feeding period. With the exception of the 1953 spring experiment, the initial and final weight of the sows was also recorded.

Litters used on trials at the Ohio State University were those farrowed in the University herd and consisted of pigs of the following five breeds: Hampshire, Chester White, Berkshire, Yorkshire and Duroc. The sows and their litters were moved to alfalfa pasture when the pigs were from 7 to 10 days of age. Creep feed was either offered at this time or later, as indicated in the discussion of each trial. A lot consisted of 3 to 4 sows and their litters on approximately 0.75 acre of alfalfa. Creep feeds were offered in 25 bushel—8 hole self feeders. Bars were installed above the feeding cups to prevent the sows from eating creep feed. A wet feed was hand fed twice daily to the sows. Weight of the sow's feed as dry feed was recorded. The composition of the creep feeds is shown in Table 15. They were calculated to contain 17-18% crude protein.

THE SUBSTITUTION OF FINELY GROUND CLIPPED OATS FOR ALL OR A PORTION OF THE OAT GROATS IN A PELLETTED CREEP FEED¹

Ohio Agricultural Experiment Station

Hulled oats are considered to be one of the more palatable feeds for young pigs and are therefore used as a major ingredient in many creep feeds. They have the disadvantage of being a relatively high cost ingredient.

Finely ground clipped oats, weighing 44 pounds per bushel, were substituted for a portion or all of the oat groats in a pelleted creep feed. The higher crude fiber content of clipped oats increased the total level of crude fiber in the feed so that when 14.5, 31.0 and 48.2 percent were included the respective levels of fiber were 3.1, 4.7 and 5.7 percent. These levels were in contrast to 2.1 and 2.4 percent crude fiber in the control feeds which contained 44 percent oat groats.

Because of pasture conditions in the spring of 1954, the sows and litters were not moved to the pasture lots before the oldest pigs averaged 28 days of age. Therefore, this and subsequent studies were initiated when the pigs averaged 28 to 29 days of age. If available, some creep feed will be consumed prior to this time; however, where measured, 95 percent or more of the amount eaten during an eight week suckling period was consumed during the last 28 days.

¹Creep feeding Experiment II and the individual feeding and digestion trials accompanying this experiment were conducted by Forrest J. Schollenberger for a thesis in partial fulfillment for the degree of Master of Science, Ohio State University, 1955.

The results when the performance of gilt and sow litters was compared separately are shown in Table 1.

The substitution of clipped oats for a portion or all of the oat groats did not materially influence the palatability of the feed nor pig performance. In Experiment I, pigs in gilt litters ate an average of 3.3 pounds less of the higher fiber feed while in Experiment III an average of 2.6 pounds more of the higher-fiber feed was eaten as creep feed during the four week feeding period. Sow litters ate more of the higher

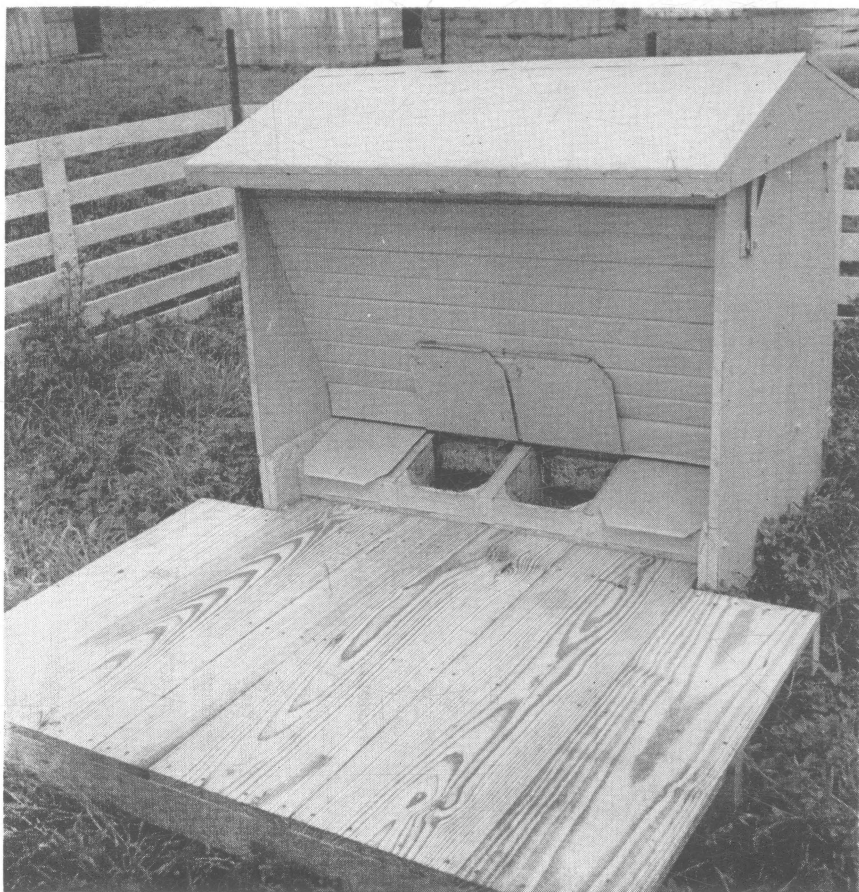


Fig. 1.—A self feeder showing feeding platform and open feeder lids to encourage greater feed consumption.

**TABLE 1.—The Performance of Pigs Fed Pelleted Creep Feeds Containing Different Levels of Oat Fiber*
Ohio Agricultural Experiment Station**

Experiment number	Gilt Litters				Sow Litters				
	I		III		I		II		
	1954 spring		1955 spring		1954 spring		1954 fall		
Lot number	1	2	3	4	5	6	7	8	9
Total dietary crude fiber, % †	2.4	5.5	2.4	5.5	2.4	5.5	2.1	3.1	4.7
Number of litters	6	7	6	5	6	6	5	5	5
Number of pigs at end of trial‡	53	61	50	46	49	51	43	47	36
Average litter size	8.8	8.7	8.3	9.2	8.2	8.5	8.6	9.4	7.2
Average initial age, days	29	28	29	29	28	29	28	28	28
Average final age, days	53	52	57	57	52	53	54	54	54
Number days creep feed available	24	24	28	28	24	24	26	26	26
Average initial weight, lb.	12.6	12.3	13.8	14.6	16.2	14.4	16.2	13.9	14.9
Average final weight, lb.	34.1	29.5	38.4	40.0	38.7	37.8	45.4	41.6	41.3
Average total gain, lb.	21.5	17.2	24.6	25.4	22.5	23.4	29.2	27.7	26.4
Average daily gain, lb.	0.90	0.72	0.88	0.91	0.94	0.98	1.12	1.06	1.01
Average total creep feed consumed per pig, lb.	20.3	17.0	24.0	26.6	19.8	23.7	33.4	28.8	29.3
Average weight gain or loss of sows, lb.	— 0.5	— 5.0	+ 3.5	+ 3.0	—23.3	—10.3	+ 4.6	—12.6	— 1.9

*Increased fiber levels obtained by the substitution of finely ground clipped oats for all or a portion of the oats groats (see Table 14).

†A.O.A.C. analysis.

‡One pig in Lot 7 and one in Lot 8 died during the creep feeding period.

9

fiber feed in Experiment I and less in Experiment II. Except for a 0.05 pound difference in average daily gain between pigs in Lots 8 and 9, the pigs which consumed the greatest average amount of creep feed in all cases made the highest average daily gain.

Sow weight gain or loss was highly variable and appeared unrelated to the type of creep feed consumed by the pigs. The greatest average loss of 23.3 lbs. and the greatest average gain of 4.6 lbs. both occurred in sow lots in which the pigs were fed the lower-fiber feed.

In these and other studies, initial weight at four weeks in many cases appeared to be an important factor influencing creep feed consumption and rate of gain. Pigs heavier at four weeks tended to gain at a more rapid rate and consume a greater quantity of creep feed during the remainder of the pre-weaning period. The pelleting of the feeds may have enhanced their consumption as creep feeds, particularly those containing the higher levels of oat fiber. Based on the current cost of feed ingredients, feed cost was lowered approximately \$1.00 per hundred by the substitution of clipped oats for all of the oat groats in these feeds.

INDIVIDUAL FEEDING AND METABOLISM TRIALS

In two experiments, the creep feeds containing different amounts of oat hull fiber were fed as starter feed to individual pigs weaned at 3 or 4 weeks of age. Crossbred Duroc \times Beltsville No. 1 littermate pigs were used. In Experiment II, two pigs from each lot were slaughtered at the end of the feeding period to observe whether a difference in level of fiber had influenced certain body weight measurements. The feeding results are shown in Table 2 and slaughter data at 56 days in Table 3.

In Experiment I, pigs which received the higher fiber ration on an average consumed more feed, gained more rapidly and converted feed to gain more efficiently than those which received the lower fiber oat groat feed. The pigs in Experiment II, although one week younger at the start were heavier, on an average, than those in the first study. This litter performed well—averaging 55.1 lbs. at 8 weeks, at which time the trial was terminated. Even though a variation in performance was noted, the results do not indicate that the higher fiber feeds were in any way inferior to those containing the lower levels of fiber when fed as starter feed.

The dressing percentage of the pigs slaughtered at 56 days ranged from 67.7 to 73.8 percent. The two pigs which consumed the lowest fiber feed represented both the lowest and the highest yield. Full visceral weight was greater for the two pigs fed the 4.7% fiber but when

**TABLE 2.—The Performance of Littermate Pigs Individually Fed Starter Feeds
Containing Different Levels of Oat Fiber*
Ohio Agricultural Experiment Station**

	Experiment I						Experiment II						
	2.4			5.5			2.1		3.1		4.7		
Pig number	132	134	136	133	137	138	23	29	25	27	26	28	24
Initial age, days	28	28	28	28	28	28	21	21	21	21	21	21	21
Feeding period, days	28	28	28	28	28	28	35	35	35	35	35	35	35
Initial weight, lb.	12.2	10.7	12.3	12.1	12.0	12.9	12.7	16.0	14.6	15.3	10.8	15.2	14.9
Final weight, lb.	33.5	19.7	39.9	42.1	37.4	44.6	49.5	63.0	54.0	56.5	42.5	58.0	62.5
Average daily gain, lb.	0.76	0.32	0.99	1.07	0.91	1.13	1.05	1.34	1.13	1.18	0.91	1.22	1.36
Average daily feed consumption, lb.	1.43	0.96	1.70	1.86	1.62	1.88	1.84	2.66	2.24	2.18	1.81	2.41	2.59
Feed per pound of gain	1.88	2.99	1.72	1.73	1.78	1.66	1.75	1.98	1.99	1.85	1.99	1.97	1.90

*Composition of feeds shown in Table 14.

**TABLE 3.—Slaughter Data at 56 Days for Pigs Individually Fed
Starter Feeds Containing Different Levels of Oat Fiber
(Experiment 11) (Weight in pounds)
Ohio Agricultural Experiment Station**

Total dietary crude fiber, %	2.1		3.1		4.7	
	23	29	25	27	28	24
Pig number						
Live weight at slaughter	49.5	63.0	54.0	56.5	58.0	62.5
Warm carcass weight	33.5	46.5	38.0	39.0	41.5	43.0
Dressing percentage	67.7	73.8	70.4	69.0	71.5	68.8
Weight of full viscera*	11.04	10.20	11.30	11.44	13.43	13.50
Weight of full viscera as percent of live weight	22.3	16.2	20.9	20.2	23.1	21.6
Weight of full large intestine	2.40	3.04	3.33	3.28	2.47	4.00
Weight of full large intestine as per- cent of live weight	4.85	4.82	6.17	5.80	4.26	6.40
Weight of full cecum	0.42	0.42	0.30	0.42	0.50	0.61
Weight of full cecum as percent of live weight	0.85	0.67	0.79	0.74	0.86	0.98

*Viscera included the digestive tract and lungs.

related to live weight was not consistently greater. The cecum weight of the pigs fed the highest fiber feed was somewhat greater, both in terms of total weight as well as percent of live weight, when compared to pigs fed the lower fiber feed. These observations suggest that a greater weight of ingesta is retained at any given time when higher fiber feeds are consumed. However, the variation in measurements indicates a greater number of animals is needed for a more reliable comparison.

Six three week old litter mate Yorkshire-Duroc × Duroc pigs were weaned and used in a metabolism study to determine the digestibility of the 2.4 and 5.5% fiber feeds. The mean digestion coefficients obtained from two trials with each group of three pigs are shown in Table 4.

The apparent digestibility of the dry matter of the oats great starter was 86.6% compared to 78.3% for the dry matter of the clipped oat feed. However, based on the efficiency of feed conversion, an average of 6% less digestible dry matter was required per pound of gain by pigs fed the higher fiber ration. The coefficients of digestibility of the protein and N.F.E. of the two starters were much the same, while there was a lower percent of the fat and fiber of the higher-fiber feed

**TABLE 4.—The Digestibility of Feeds Containing
Different Levels of Oat Fiber**

	Digestibility—percent				
	Dry matter	Protein	Fat	Fiber	NFE
Oat groat starter (2.4 % fiber)	86.6	78.7	87.0	33.8	98.7
Clipped oat starter (5.5 % fiber)	78.3	78.7	78.6	26.6	97.0

digested. In view of the lower digestible dry matter requirements for weight gain by the pigs fed the higher fiber feed, and the fact that the apparent digestibility of none of the feed components of this feed was higher, it appears that some component or physical property of the feed increased its efficiency of utilization.

THE INCLUSION OF CANE SUGAR IN PELLETED CREEP FEEDS

Ohio Agricultural Experiment Station

The effect on palatability and pig performance of including 7.5 or 15.0% cane sugar in a pelleted creep feed was observed. The amounts of corn and soybean oil meal were adjusted to equalize crude protein content.

The feeds were first offered to individual litters on the 7th post-farrowing day and consumption of feed by litters measured from the 7th through the 28th day. Data obtained during this early creep feeding period in the 1954 spring experiment are shown in Table 5. On several occasions during the fall experiment (Experiment II) rain dampened the feed in the feeders, preventing an accurate measure of consumption. Because of this inaccuracy, data for these litters during the early creep feeding period are not shown in the table.

There was a large variation in the litter consumption of creep feed in both groups. Although, on an average, slightly more was consumed by Lot 2 litters, a definite preference for the feed containing sugar was not shown. If the results are viewed in terms of litter size and gain in weight during the three week period, it appears that the creep feed consumed may have supplemented what was an inadequate supply of sow's milk. However, the amount eaten was not always greater for the larger sized litters.

TABLE 5.—The Performance of Individual Litters Fed Pelleted Creep Feeds Containing Different Levels of Cane Sugar
(7-28 days—Experiment 1, 1954 spring) (Weight in pounds)
Ohio Agricultural Experiment Station

	Gilt No.	Litter size	Average weight		Creep feed consumed, days				Weight gain or loss of gilts, 7-28 days
			7 days	28 days	7-14	14-21	21-28	Total	
Creep feed without added sugar*									
Lot 1	150	11	5.0	14.3	0.4	2.5	12.3	15.2	—32
	292	6	5.0	15.1	0.0	2.0	0.8	2.8	0
	300	10	4.9	13.9	0.5	1.8	5.2	7.5	—38
	287	6	5.6	18.4	0.1	1.7	2.2	4.0	—9
	299	8	3.4	13.8	0.3	1.1	0.3	1.7	+14
	Total	41			1.3	9.1	20.8	31.2	
	Average†	8.2	4.75	16.30	0.26	1.82	4.16	6.24	—13.0
Creep feed containing 7½% cane sugar*									
Lot 2	71	8	6.7	19.1	1.4	2.1	1.0	4.5	—44
	266	7	4.9	17.1	0.4	2.7	6.0	9.1	—3
	314	10	4.4	12.7	1.3	0.8	1.3	3.4	+2
	288	6	4.4	15.7	1.1	1.1	8.7	10.9	+19
	286	8	6.6	17.5	0.3	10.7	5.0	16.0	—34
	Total	39			4.5	17.4	22.0	43.9	
	Average†	7.8	5.41	16.25	0.9	3.48	4.4	8.78	—12.0

*Composition of feeds shown in Table 14.

†Weighted averages for initial and final pig weights.

When the youngest litter in each lot reached four weeks of age the litters were turned out of the individual litter units and provided with a paneled creep feeding area. The results when the same creep feeds were offered during this later feeding period are shown in Table 6.

In both experiments the group feeding period lasted 21 days, beginning with pigs averaging 33 and 34 days of age in the first, and 29 days of age in the second. There were no large differences in the performance of those fed the sugar or no-sugar feed. Based on average consumption figures, the addition of 7½% or 15% sugar did not improve and may have decreased the palatability of these creep feeds

TABLE 6.—The Performance of Pigs Fed Pelleted Creep Feeds Containing Different Levels of Cane Sugar
Ohio Agricultural Experiment Station

Experiment number	Gilt litters		Sow litters	
	I		II	
Year and season	1954 spring		1954 fall	
Lot number	1	2	3	4
Creep feed*	No sugar	7½ % sugar	No sugar	15 % sugar
Number of litters	5	5	4	5
Number of pigs, end of trial†	41	39	36	46
Average litter size	8.2	7.8	9.0	9.2
Average initial age, days	34	33	29	29
Average final age, days	55	54	50	50
Number days creep feed available	21	21	21	21
Average initial weight, lb.	16.9	19.2	15.5	16.0
Average final weight, lb.	37.3	37.4	36.7	36.4
Average total gain, lb.	20.4	18.2	21.2	20.4
Average daily gain, lb.	0.97	0.87	1.01	0.97
Average total creep feed consumed per pig, lb.	19.8	17.3	20.5	18.3
Average weight gain or loss of sows, lb. . . .	+17.4	+ 1.6	+ 1.2	+ 1.3

*Composition of creep feeds shown in Table 14.

†One pig in Lot 4 died during the creep feeding period.

Furthermore, feed containing 15% sugar appeared to be no more palatable than that containing 7½% sugar. Pigs which received the no-sugar feed, in Experiment I, averaged 2.3 pounds lighter at the start yet were 2.2 pounds heavier at the close of the feeding period than those fed the feed containing 7½% sugar. The average daily gain of both lots of pigs in Experiment II was very similar.

As can be seen from Table 5, the gain or loss in weight of the gilts from the 7th to 28th post-farrowing day was highly variable. Gilts in Lot 1 lost an average of 13.0 pounds during this period compared to an average loss of 12.0 pounds by gilts in Lot 2. During the next 21 days gilts in the same lots gained an average of 17.4 and 1.6 lbs., respectively.

CANE SUGAR ADDED AS A COATING TO PELLETED CREEP FEEDS

Ohio Agricultural Experiment Station
and
Ohio State University

Comparisons were made between the feeding value of a pelleted creep feed with or without an 11-12 percent coating of cane sugar.

At the Experiment Station the composition of the sugar-coated feed was adjusted to contain 18% crude protein. A dried molasses feed used was stated by the manufacturer to contain 40% sugars. This, plus the 5.2% cerelese (corn sugar), made a total of 7.2% sugar in the pelleted feed and 19.2% in the sugar coated pellets. The average initial age of the sow litters was 29 or 30 days and the average age of the gilt litters 27 or 30 days. Creep feed was available for 28 days in all but Lot 3 where, because of the initiation of dry lot feeding experiments, the test period lasted only 26 days.

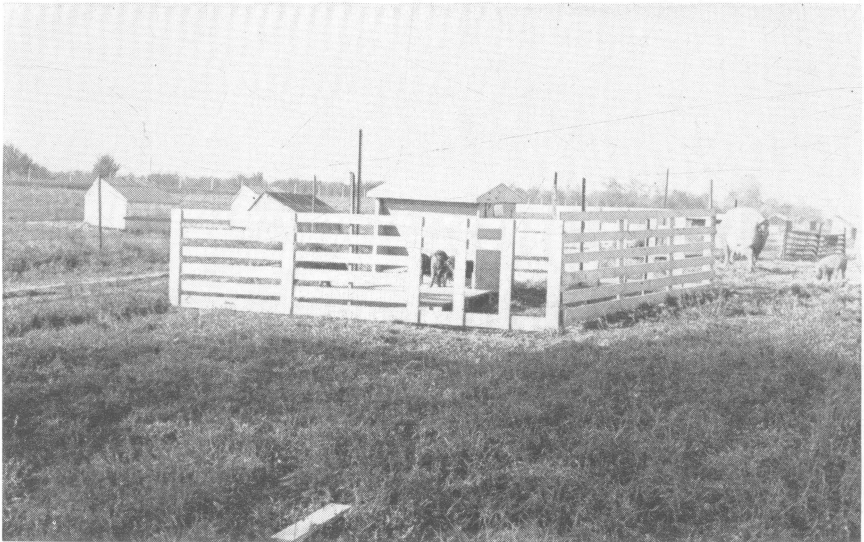


Fig. 2.—A paneled creep feeding area. The panel openings are small enough to prevent sows from entering.

TABLE 7.—The Effect of Adding 12 Percent Cane Sugar as a Coating to Pelleted Creep Feed Containing 5.2 Percent Cerelose and 5.0 Percent Dried Molasses Feed

(Spring 1953)

Ohio Agricultural Experiment Station

Lot number	1	2	3	4
Creep feeds*	Pelleted	Sugar coated pellets	Pelleted	Sugar coated pellets
Calculated percent total sugar	7.2	19.2	7.2	19.2
Gilt or sow litters	Sow	Sow	Gilt	Gilt
Number of litters	7	7	7	6
Number of pigs at end of trial†	59	58	53	46
Average litter size	8.4	8.3	7.6	7.7
Average initial age, days	29	30	30	27
Average final age, days	57	58	56	55
Number days creep feed available	28	28	26	28
Average initial weight, lb.	15.3	15.6	14.8	13.6
Average final weight, lb.	43.2	41.2	40.3	38.3
Average total gain, lb.	27.9	25.6	25.5	24.7
Average daily gain, lb.	1.00	0.91	0.98	0.88
Average total feed consumed per pig, lb.	31.1	31.4	27.8	24.6

*Both feeds calculated to contain 18 percent crude protein. Composition shown in Table 14.

†One pig in Lot 2 and one in Lot 3 died during the creep feeding period.

Performance data for the four groups is shown in Table 7. The pigs in Lot 1 fed the pelleted feed without a sugar coating gained an average of 2.3 pounds more than those in Lot 2 and consumed essentially the same amount of creep feed. Although gilt litters, on the average, ate less than either group of sow litters, their performance was considered very satisfactory. Pigs in Lot 3, with feed available for only 26 days, on an average, ate more of the pelleted feed and gained 0.8 lb. more than those in Lot 4 with access to the sugar-coated feed. Thus, in this trial, sugar coating of the pelleted feed had no marked effect on its palatability.

In a trial conducted with the University herd, 11.4% cane sugar was added as a coating to pelleted feed. The results are given in Table 8. In this trial pigs had access to the creep feeds from 3 to 5 days of age until approximately 8 weeks of age. Lots 1 and 2 consisted of sow litters and Lots 3 and 4 gilt litters.

TABLE 8.—The Effect of Adding 11.4 Percent Cane Sugar as a Coating to Pelleted Creep Feed (Spring 1953)*

Ohio State University

Lot number	1	2	3	4
Creep feeds	Pelleted	Sugar coated pellets	Pelleted	Sugar coated pellets
Calculated percent total sugar		11.4		11.4
Gilt or sow litters	Sow	Sow	Gilt	Gilt
Number of litters	3	3	4	4
Number of pigs at end of trial	25	28	33	29
Average litter size	8.3	9.3	8.2	7.2
Average initial age, days†	5.0	3.1	5.4	5.3
Average final age, days	56.4	55.7	54.9	55.9
Number days creep feed available	51.4	52.6	49.5	50.6
Average initial weight, lb.†	4.8	4.3	4.9	3.9
Average final weight, lb.	47.1	46.1	36.6	39.8
Average total gain, lb.	42.3	41.8	31.7	35.9
Average daily gain, lb.	0.82	0.80	0.64	0.71
Average total feed consumed per pig, lb.	38.3	43.8	16.9	23.3
Average daily feed consumed per sow, lb.	13.0	13.5	13.2	13.2

*Composition of feeds shown in Table 15.

†For pigs that finished the trial.

The average daily gain per pig in these lots was very similar with only a 0.02 lb. per pig per day difference in favor of pigs fed the non-sugar-coated pellets. However, the average quantity of sugar coated pellets consumed by the Lot 2 pigs was 5.5 pounds greater than the quantity of non-sugar-coated pellets consumed by the Lot 1 pigs.

Lots 3 and 4 consisted of gilt litters. The daily gain of the pigs receiving sugar-coated pellets averaged 0.07 lb. greater and 6.4 lbs. more of the sugar-coated pellets were consumed per pig than in Lot 3 fed the pelleted feed. While the final weight of the pigs from gilts may be considered acceptable, they did not consume a desired amount of creep feed.

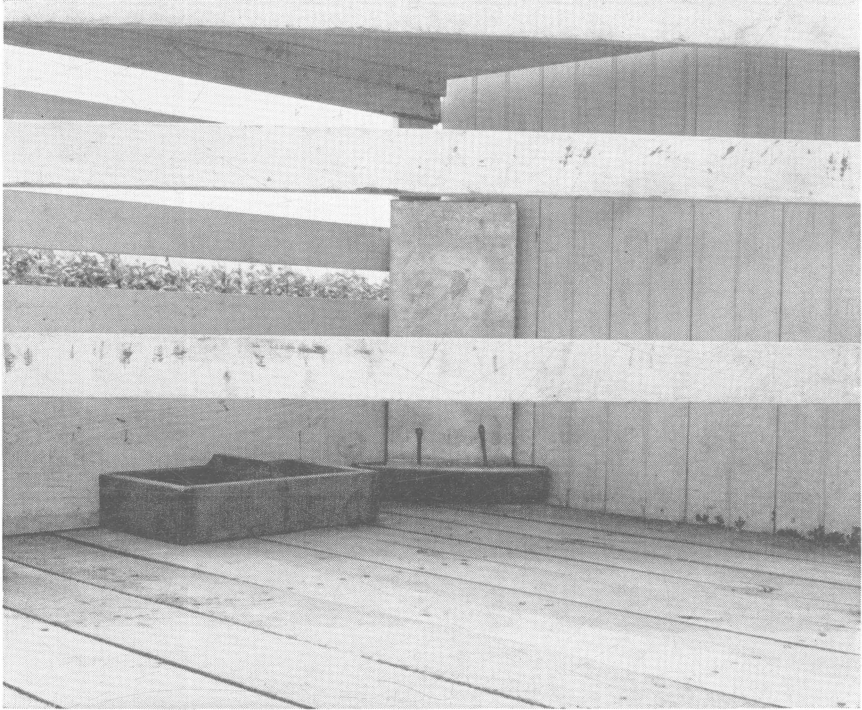


Fig. 3.—A corner-type creep feeder and box for sod used in individual litter tests.

THE INCLUSION OF CANE SUGAR IN CREEP FEEDS FED IN MEAL FORM

Ohio State University

Creep feeds containing various amounts of sugar are available commercially. Since the inclusion of sugar in these feeds increases their cost, the value of this practice was determined. Using pigs farrowed in the University herd in the spring of 1954 and 1956, creep feeds containing 6% cane sugar were compared with creep feeds containing no sugar. In each trial, Lot 1 litters received a creep feed containing no sugar, Lot 2 received a creep feed containing 6% sugar and Lot 3 had access to both feeds separately in the same self feeder. In an attempt to eliminate habits which the pigs might form by eating continuously from a certain area of the feeder, the feeder in Lot 3 was

TABLE 9.—The Performance of Pigs Group Fed Meal Creep Feeds Containing Cane Sugar

(Spring 1954)*

Ohio State University

Lot number	1	2	3‡
Creep feed	No sugar	6% sugar	No sugar and 6% sugar
Number of litters	3	3	3
Number of pigs at end of trial	27	23	24
Average litter size	9.0	7.7	8.0
Average initial age, days†	12.1	12.2	10.9
Average final age, days	56.3	56.2	55.8
Number days creep feed available	38.1	41.2	38.0
Average initial weight, lb.†	8.9	8.1	8.1
Average final weight, lb.	46.3	48.7	43.2
Average total gain, lb.	37.4	40.6	35.1
Average daily gain, lb. . . . .	.84	.92	.78
Average daily creep feed consumed per pig, lb. . . . .	.89	1.01	.66
Average daily feed consumed per sow, lb.	13.6	13.4	13.9
Average weight gain (+) or loss (—) of sows, lb.	—29.3	— 3.4	—12.7

*Composition of creep feeds shown in Table 15.

†For pigs that finished the trial.

‡The two feeds were offered in separate compartments of a self feeder. The feeder was turned end for end at weekly intervals.

turned 180 degrees once each week during the trial. The pigs were started on test when an average of 11 to 12 days of age and taken off at an average of 56 days. The results of the first trial are given in Table 9.

The lot receiving only the meal containing sugar made the greatest daily gain, ate the most creep feed per pig per day (0.12 lb. more than Lot 1) and the dams in this lot lost the least weight. The pigs which received a choice of the two feeds did not eat as much total feed per pig nor gain as rapidly as did the pigs which received the sugarless feed. With a choice, they consumed four times as much of the sugar-containing feed.

**TABLE 10.—The Performance of Pigs Group Fed Meal Creep
Feeds Containing Cane Sugar
(Spring 1956)*
Ohio State University**

Lot number	1	2	3‡
Creep feed	No sugar	6% sugar	No sugar and 6% sugar
Number of litters	3	3	3
Number pigs at end of trial	25	29	31
Average litter size	8.3	9.6	10.3
Average initial age, days†	19.0	23.8	21.4
Average final age, days	56.0	54.8	54.4
Number days creep feed available	37.0	31.0	33.0
Average initial weight, lb.†	9.4	12.9	11.2
Average final weight, lb.	42.6	43.7	39.0
Average total gain, lb.	33.2	30.8	27.8
Average daily gain, lb. . . . .	.90	.99	.84
Average daily creep feed consumed per pig, lb.	1.04	1.05	1.04
Average daily feed consumed per sow, lb.	14.3	16.3	14.3
Average weight gain (+) or loss (—) of sows, lb.	+ 4.6	—16.0	—28.0

*Composition of creep feeds shown in Table 15.

†For pigs that finished the trial.

‡The two feeds were offered in separate compartments of a self feeder. The feeder was turned end for end at weekly intervals.

Table 10 shows the results of the second trial in which pigs 19 to 24 days of age at the start and 54 days of age at the finish were offered similar feeds to those fed in the first trial.

Again, the pigs receiving only the sugar feed made the greatest average daily gain (0.09 lb. more per pig per day than Lot 1). It should be noted that Lot 2 pigs were 4 days older than the Lot 1 pigs at the start of the experiment. The pigs in Lot 3, where a choice was available, made 0.06 lb. less gain per pig per day than did the pigs in Lot 1. The average amount of feed eaten per pig per day was essentially the same for all lots. In Lot 3 the sugar feed was preferred over the non-sugar feed in a ratio of 14:1. Only in Lot 1 did the dams maintain and increase their weight during the trial.

MEAL VERSUS THE PELLETED FORM OF A CREEP FEED

Ohio Agricultural Experiment Station and Ohio State University

The physical characteristics of a creep feed appear to influence its palatability. Feed consumption and pig performance were compared when the same creep feed was offered in either meal or pelleted form.

In the Experiment Station herd a lot of seven sow litters received the meal form and one lot of seven sow litters and another of seven gilt litters received the pelleted form of the same feed. At the beginning of the experiment the litters averaged 29 or 30 days of age. The creep feeds were available for 28 days in Lots 1 and 2, and 26 days in Lot 3. No creep feed was fed prior to the start of the test. The results are shown in Table 11.

Average litter size in Lots 1 and 2 was very similar. However, at the start of the test, Lot 2 pigs averaged 1.6 lbs. heavier than pigs in Lot 1. This difference in average initial weight was reflected in the same average difference in the final weight of pigs in these lots. Lot 1

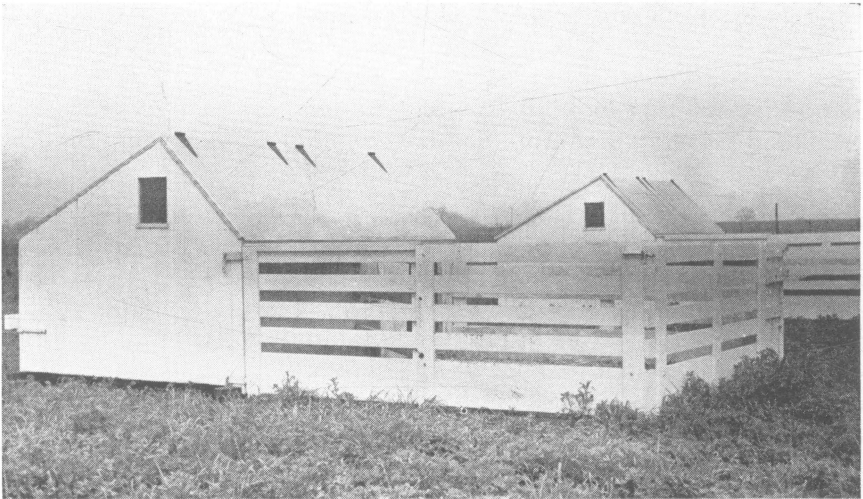


Fig. 4.—Field house and paneled feeding platform. This unit permits measurement of the creep feed consumption of a single litter.

**TABLE 11.—The Performance of Pigs Fed Meal Versus
the Pelleted Form of a Creep Feed**

(Spring 1953)*

Ohio Agricultural Experiment Station

Lot number	1	2	3
Form of creep feed	Meal	Pelleted	Pelleted
Gilt or sow litters	Sow	Sow	Gilt
Number of litters	7	7	7
Number of pigs at end of trial†	60	59	53
Average litter size	8.6	8.4	7.6
Average initial age, days	29	29	30
Average final age, days	57	57	56
Number days creep feed available	28	28	26
Average initial weight, lb.	13.7	15.3	14.8
Average final weight, lb.	41.6	43.2	40.3
Average total gain, lb.	27.9	27.9	25.5
Average daily gain, lb.	1.00	1.00	0.98
Average total creep feed consumed per pig, lb.	34.3	31.1	27.8

*Composition of feeds shown in Table 14.

†One pig in Lot 3 died during the creep feeding period.

pigs ate an average of 3.2 lbs. more creep feed as a meal than those in Lot 2 fed pellets. Both rates of consumption were considered very satisfactory.

The performance of the gilt litters in Lot 3 cannot be directly compared to that of pigs in Lots 1 and 2. However, by way of comparison, their average gain and feed consumption for 26 days was higher than that of other gilt litters fed sugar-coated pellets during a 28-day feeding period. (See Table 7).

Similar comparisons of the meal and pelleted form of a creep feed were made in the University herd in the spring and fall of 1953.

In the first trial (Table 12) the dams and their litters were moved to alfalfa pasture lots when the litters ranged in age from 5.0 to 7.4 days. The pigs were given access to creep feed from this time until approximately 8 weeks of age. Those which consumed the pelleted

**TABLE 12.—The Performance of Pigs Fed Meal Versus
the Pelleted Form of a Creep Feed**

(Spring, 1953)*

Ohio State University

Lot number	1	2	3	4
Form of diet	Meal	Pelleted	Meal	Pelleted
Gilt or sow litters	Sow	Sow	Gilt	Gilt
Number of litters	3	3	4	4
Number of pigs at end of trial	29	25	32	33
Average litter size	9.7	8.3	8.0	8.2
Average initial age, days†	7.4	5.0	6.7	5.4
Average final age, days	56.8	56.4	57.6	54.9
Number days creep feed available	49.4	51.4	50.9	49.5
Average initial weight, lb.†	6.0	4.8	4.3	4.9
Average final weight, lb.	45.0	47.1	35.3	36.6
Average total gain, lb.	39.0	42.3	30.0	31.7
Average daily gain, lb.	0.79	0.82	0.61	0.64
Average total creep feed consumed per pig, lb.	37.9	38.3	17.0	16.9
Average daily feed consumed per sow, lb. . . .	13.5	13.0	10.6	13.2

*Composition of feeds shown in Table 15.

†For pigs that finished the trial.

feed (Lots 2 and 4) made only a slightly greater average gain per day (0.03 lb.) than the pigs receiving the meal. Essentially equal amounts of creep feed were consumed by the pigs in all lots.

The results of a second trial conducted with sow litters is shown in Table 13. Again the dams and their litters were moved to alfalfa pasture lots shortly after farrowing. In this study the creep feeds were not available until the pigs averaged approximately 11 days of age. Those with access to the pelleted feed made an average of 1.5 lbs. greater total gain and consumed 6.0 lbs. less total creep feed than those fed the meal.

**TABLE 13.—The Performance of Pigs Fed Meal Versus
the Pelleted Form of a Creep Feed**

(Fall, 1953)*

Ohio State University

Lot number	1	2
Form of diet	Meal	Pelleted
Gilt or sow litters	Sow	Sow
Number of litters	9	9
Number of pigs at end of trial	63	62
Average litter size	7.0	6.9
Average initial age, days†	11.1	10.7
Average final age, days	56.8	56.1
Number days creep feed available	42.8	41.7
Average initial weight, lb.†	7.2	6.8
Average final weight, lb.	39.2	40.3
Average total gain, lb.	32.0	33.5
Average daily gain, lb.	0.70	0.74
Average total creep feed consumed per pig, lb.	24.8	19.8
Average daily feed consumed per sow, lb.	13.5	13.7

*Composition of feeds shown in Table 15.

†For pigs that finished the trial.

SUMMARY and CONCLUSIONS

The inclusion of from 14.5 to 48.2 percent of finely ground clipped oats replacing an equal quantity of oat groats did not materially influence the palatability of creep feeds nor affect pig performance. When further evaluated in feeding trials with pigs weaned at three weeks of age the feeds were shown to have similar feeding value. In digestion trials, although there was an apparent decrease in the digestibility of the dry matter of the higher fiber feed, less of the digestible dry matter of this feed was required per unit of weight gain. Slaughter and examination of the pigs at 8 weeks revealed that a greater quantity of ingesta was retained at a given time by those fed the higher fiber feed.

Where the amount of creep feed eaten by litters from the 7th to 28th post-farrowing day was measured the quantity consumed was

TABLE 14.—Percentage Composition of Creep Feeds
Ohio Agricultural Experiment Station

Ingredients	Different levels of oat fiber					Different levels of cane sugar			Meal vs. pellets or sugar-coated pellets	
	Total dietary crude fiber					No sugar	7.5% sugar	15.0% sugar	Meal or pellets	Sugar-coated pellets
	2.1%	2.4%	3.1%	4.7%	5.5%					
Oat groats, ground	44.0	44.2	25.0	—	—	46.0	46.0	46.0	47.0	36.8
Clipped oats, ground	—	—	14.5	31.0	48.2	—	—	—	—	—
Shelled corn, ground	28.2	25.0	29.4	33.5	17.0	30.2	21.0	12.2	19.0	14.1
Soybean oil meal, 44%	12.0	15.0	15.3	19.7	19.0	9.0	10.7	12.0	9.0	10.6
Dried skim milk	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.9
Fish meal (Menhaden)	—	—	—	—	—	4.0	4.0	4.0	4.0	5.3
Cerelose	—	—	—	—	—	—	—	—	5.2	4.6
Cane sugar	—	—	—	—	—	—	7.5	15.0	—	12.0**
Dried molasses feed*	—	—	—	—	—	—	—	—	5.0	4.4
Molasses, cane	5.0	5.0	5.0	5.0	5.0	—	—	—	—	—
Crude corn oil	—	—	—	—	—	—	—	—	2.0	1.8
Stabilized animal fat	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	—	—
Steamed bone meal	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9
Ground limestone	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9
Trace mineralized salt	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
B-vitamins supplement†	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
B ₁₂ supplement‡	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Supplements per 100 lb. of feed (grams)										
Irradiated yeast, (9f)	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.00
Antibiotic§	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.5	2.2
Vitamin A supplement||	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	35.2

*Omolass (Vylactos Laboratories, Inc.).

†Fortafeed 2-49C (Lederle).

‡Profactor B (Lederle).

§Supplied as Aurofac 2A (Lederle).

||Pfizer's Vitamin A Supplement 10 (10,000 I.U./gm).

**Added as sugar coating.

TABLE 15.—Percentage Composition of Creep Feeds (Ohio State University)

	Spring, 1953			Fall, 1953		Spring, 1954		Spring, 1956	
	Meal	Pellets	Sugar-coated pellets	Meal	Pellets	Meal	Sugar in meal	Meal	Sugar in meal
Ground shelled yellow corn . . .	49.8	49.8	36.5	47.9	47.9	50.1	41.2	47.5	39.5
Rolled oats	19.9	19.9	19.2	19.2	19.2	20.1	20.1	20.0	20.0
Wheat middlings	9.9	9.9	9.6	9.6	9.6	10.0	10.0	10.0	10.0
Meat and bone scraps, 55 % C.P.	9.9	9.9	12.0	9.6	9.6	10.0	12.0	12.5	13.5
Mineral mixture*	1.6	1.6	1.5	1.5	1.5	1.6	1.6	1.6	1.6
Soybean meal, 44 % C.P.	7.0	7.0	6.7	6.7	6.7	7.0	7.0	7.3	7.5
Trace mineralized salt . . . . .	.5	.5	.5	.5	.5	.5	.5	.5	.5
Irradiated yeast (9 f.) . . . . .	.01	.01	.01	—	—	.02	.02	.02	.02
Vitamin supplement†	—	—	—	—	—	—	—	.14	.14
Vitamin B ₁₂ supplement‡	—	—	—	—	—	—	—	.15	.15
Antibiotic supplement§ . . . . .	.3	.3	.3	.3	.3	.6	.6	.3	.3
Dehydrated alfalfa meal	1.0	1.0	1.9	4.8	4.8	—	.5	—	.55
Lard	—	—	.38	—	—	—	.3	—	.25
Cane sugar	—	—	11.5	—	—	—	6.0	—	6.0

*Mineral feed, V-19 (Smith Agricultural Chemical Co., Columbus, Ohio).

†Contained per pound, 2000 mg. riboflavin, 4000 mg. calcium pantothenate, 9000 mg. niacin, 10,000 mg. choline chloride, 250 mg. pyridoxine (Peter Hand Foundation).

‡Contained 6 mg. B₁₂ per pound.

§Aurofac 2-A except in spring, 1954, when Aurofac was used (Lederle).

highly variable—ranging from 1.7 to 16.0 lbs. per litter. The inclusion of 7½ percent of cane sugar in the creep feed did not increase consumption during this early period.

In an Experiment Station trial, neither the palatability of the feed nor pig performance was improved by the addition of 12 percent cane sugar as a coating to pelleted creep feed. In a trial conducted with pigs in the University herd, an average of as much as 6.4 lbs. more creep feed was eaten when 11.4 percent cane sugar was added as a coating to pelleted feed.

In University trials, when creep feeds were fed in meal form, the inclusion of 6 percent cane sugar increased only slightly the consumption of feed and rate of gain of pigs compared to the feeding of a creep feed containing no sugar. When a choice of the two feeds was made available, a definite preference for feed containing sugar was demonstrated.

In trials conducted at both the Experiment Station and University, there was little difference in the amount of feed eaten or pig performance when creep feeds were fed in meal or pelleted form. In three of the four comparisons slightly less of the feed in pelleted form was consumed.

Throughout these studies it was observed that the early weight gains and vigor of pigs during the first three or four weeks of life greatly influenced the later consumption of creep feed and rate of gain. Thus, a successful creep feeding program requires that pigs grow rapidly and are vigorous prior to the time any large amount of creep feed will be consumed.

The weight gain or loss of sows during these studies was highly variable and did not appear to be related to the type of creep feed consumed by the pigs.