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SWINE HOUSING STUDIES: TYPE OF FLOORS, INSULATION AND METHODS OF HANDLING WASTE

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Swine housing is in an era of research, new ideas, and changes. Never before have we been more conscious of housing management and facilities for swine. Many swine producers are wondering if they should continue with the same facilities, or remodel the existing buildings, or construct a new building. If the producer decides to change or remodel, then a barrage of questions should be answered. Important considerations are: Complete confinement or pasture? What floor plan and manure handling method? Should the building be enclosed, insulated, ventilated, and how much automatic equipment?

Perhaps we should make it clear in this paper that the authors are not suggesting a change should be made by swine producers, but rather swine can be profitably reared with good management under many conditions on pasture, in confinement, or a combination of pasture and confinement. Confinement rearing is relatively new and many new ideas are being tested. The purpose of this research is to provide information on some of these ideas.

Experimental Procedure

Three temporary swine finishing houses were constructed to study the effects of different management systems and environmental conditions on the performance of swine. The results of these studies will be utilized in the design of a permanent swine finishing structure to be constructed at the station during 1963.

The buildings described herein are small, flexible test units with the designed experimental variables built into them. The size, in particular, is not recommended for practical on the farm swine units. However, the test variables, the structure of the buildings, materials used, ventilation system, and methods of handling manure should be studied closely upon inspection of the buildings and these can be considered for application in a practical size unit.

House Construction

All three of the houses are 22' by 22' in size and are partitioned through the center to give a total of six 11' by 22' pens. The houses are constructed of conventional wood framing and plywood sheathing and differ only in that two of the houses are insulated while the third house is uninsulated and has no interior sheathing. The three structures were designed to be split down the center, mounted on skids and used as movable range shelters for breeding stock when the permanent facilities are complete.

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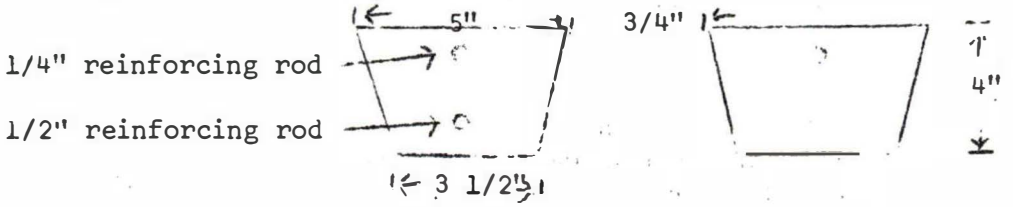
Insulation and Ventilation

The two insulated houses were constructed with identical amounts of insulation that consisted of a two-inch fiberglass blanket with vapor barrier in the walls and a three-inch fiberglass blanket with vapor barrier in the roof. A ventilation fan of 800 cfm capacity controlled by a thermostat will be installed in each house for cold weather operation.

Floor Systems

Three different floor systems were incorporated in the study, the systems included slotted floors, sloped floors with gutter, and conventional concrete floors.

Slotted floors made of concrete slats were placed in two of the pens and the hogs lived continuously on the slats. A pit, two feet deep, under the slotted floor held the manure that accumulated through the entire feeding period. No bedding was used with this system. Construction of the slats is as shown below. Slats were 5'3" long and cost $1.25 per slat.



Sloping floors (1/2 inch per foot) with a slotted gutter at the lower end were constructed in two of the pens. The hogs fed and rested on the sloping floor and the slotted floor over the gutter was utilized as a dunging area. The pens were cleaned daily by washing down the floor with a hose, the water and manure collected in the gutter and were flushed into a sanitary lagoon. No bedding was used with this floor system.

Conventional concrete floors were used in two pens and served as a control for the other floor systems. These pens were bedded and cleaned 3 times a week.

Sanitary Lagoon

A sanitary lagoon was dug to be used for manure removal with the two pens with sloping floors. The lagoon was designed allowing approximately 15 sq. ft. of surface area per hog with a depth of approximately 4 feet.

Pen Arrangements

The various pens were located in the houses as follows:

House Number 1 - Insulated, both pens with sloping floor and drain into sanitary lagoon

House Number 2 - Insulated, one pen with slotted floor, on conventional concrete

House Number 3 - Uninsulated, one pen with slotted floor, one conventional concrete floor

Cost Summary of Experimental Swine
Finishing Houses at SESD Experiment Farm

	Total Cost of Structure and Equipment	Cost Per Hog	Cost per sq. ft.
Uninsulated House			
Concrete floor	$579.20	$32.17	$2.39
Slotted floor	691.70	38.42	2.86
Insulated House			
Concrete floor	697.36	38.74	2.88
Slotted floor	809.86	44.99	3.35
Insulated House			
Sloping floor*	737.80	40.99	3.05

* Cost of both pens was identical.

The houses provided 13.4 sq. ft. per pig in housing area (18 pigs per pen). When feeders and waterers are considered, the pigs had approximately 11 sq. ft. per pig.

Results

The results of this experiment shown in table 1 are preliminary and no conclusions are made at this time. More experiments in the summer and winter will be conducted before the data will be summarized.

Although there are 6 treatments involved, for all practical purposes this summer study can be considered as having only 3 major variables: (1) slotted floors, (2) concrete floors with bedding, (3) sloping concrete floors (no bedding) with dunging alley and lagoon. The other variable in the buildings, insulation versus no insulation, was virtually eliminated during the summer by keeping all of the buildings open for free air circulation.

Pigs gained 3% faster on the concrete floors with bedding (lots 4 and 5) than the average of pigs on slotted floors (lots 3 and 6) and those on concrete with the dunging alley. The pigs gained the same on the slotted floors and concrete floor with the dunging alley.

There were some differences in feed intake and feed efficiency among the lots, but a treatment trend was not detectable.

Tail biting was a problem in some of the groups. The cannibalistic nature of one or two pigs in a pen is a problem in confined pigs. The procedure used to stop tail biting among pigs in the herd is upon detection of a problem to paint the tail with a bitter tasting substance. If tail biting continues, the pig biting the tail is removed from the pen and isolated from the other pigs for 3 to 5 days and then returned to the pen.

A study of the labor requirement for the various floors showed that more labor was required for the conventional concrete floor and the sloping floor than required by the slotted floor. The slotted floor was clean, and the pigs were generally cleaner on this floor than the other two types of flooring. Fecal material did build up around the edges of the pens where the slats rested on concrete blocks. Collection of manure under the slats throughout the feeding period worked satisfactorily. The floor arrangement and the management in the house with the sloping floor and dunging alley was as good as expected. Pigs rested in the higher end of the floor and the floor was dry and clean. Pens on the level concrete floor generally had wet areas and the bedding area was often wet. Cleaning these pens every other day helped keep the pigs fairly clean. Detailed studies on the labor and equipment requirements of these buildings are in progress, but will not be reported until more data are collected.

Table 1. Results - Summer 1962

House Number	1		2		3	
Lot No.	1	2	3	4	5	6
Floor Type	Concrete, slotted dunging alley		Slotted	Concrete	Concrete	Slotted
Insulation	Yes		Yes	Yes	No	No
No. pigs	18	16	18	18	18	18
Av. initial wt., lb.	33.5	33.8	33.5	33.3	33.7	33.3
Av. final wt., lb.	196.3	202.5	205.9	194.9	202.3	200.2
Days on experiment	115.2	114.0	122.2	110.0	114.0	114.7
Av. daily gain, lb.	1.41	1.48	1.41	1.47	1.48	1.46
Av. daily feed, lb.	4.82	4.85	4.70	4.99	4.77	5.00
Feed per lb. of gain, lb.	3.41	3.27	3.33	3.39	3.22	3.43