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# Comparison of outdoor and confinement nursery systems for feeder pig production



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# C O N T E N T S

	<i>Page</i>
MATERIALS AND METHODS .....	4
RESULTS .....	6
MANAGEMENT OF SOWS AND PIGS OUTSIDE .....	9
CONCLUSIONS .....	9

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## COMPARISON OF OUTDOOR AND CONFINEMENT NURSERY SYSTEMS FOR FEEDER PIG PRODUCTION

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**T**HE COST of swine farrowing and nursery facilities combined with the cost of available money (interest rate) to construct such facilities have made it necessary to explore alternatives to confinement systems for raising feeder pigs. Economic analyses comparing confinement systems with pasture systems have assumed that labor requirements per pig are increased, capital investment is decreased, and sow and pig performance are decreased with a pasture system. However, there is no known recent research comparing the performance of pigs in pasture systems with those in a confinement system in which there were similar health and feeding programs of the sows and pigs.

A study recently completed at the Alabama Agricultural Experiment Station set out to determine the differences in productivity in litters and pigs which were all farrowed in a central farrowing house but the sows and litters, during the lactation phase, were housed in either a concrete-floored sow-pig nursery, figure 1, or put on pearl-millet pastures at various times after farrowing. A second objective was to determine if sows could be bred during lactation without utilizing hormone treatments. Breeding during lactation would allow more litters to be produced per sow per year without early weaning. Thus, expensive nursery facilities for the pigs weaned at young ages would not be required for acceptable performance of the weaned pigs.

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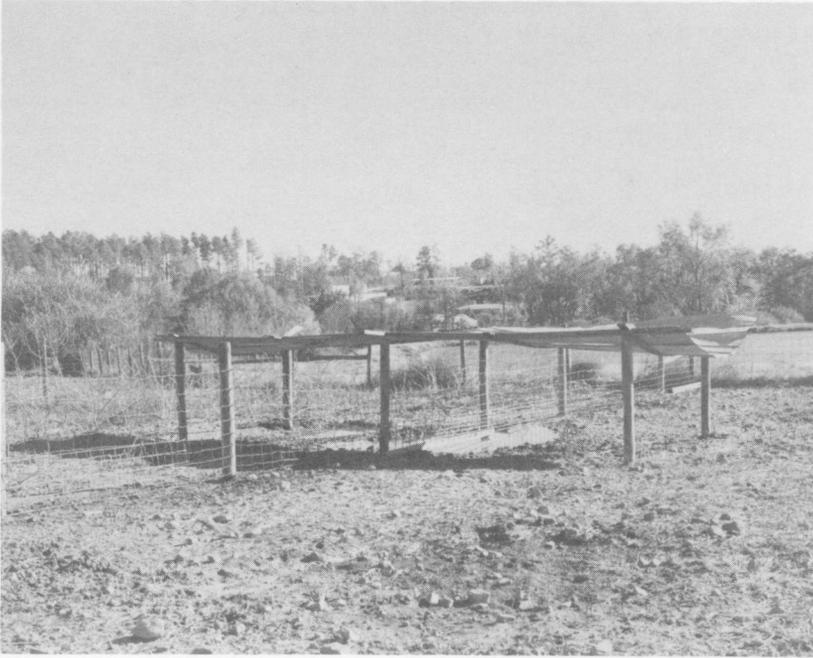


FIG. 1. The confinement nursery which was compared to the pasture nursery systems.

## MATERIALS AND METHODS

A total of 66 litters (42 first litter and 24 second litter sows) totaling 695 pigs were farrowed in two farrowing groups. The first farrowing group was from May 26 through July 4 and the second farrowing group was from August 7 through September 18. All sows were farrowed in an environmentally controlled farrowing house with individual farrowing crates. Prior to farrowing, all sows were vaccinated for atrophic rhinitis and *Escherichia coli* scours to pass immunity for these diseases to their offspring.

At farrowing, the sows were assigned to groups of two to four sows which had farrowing dates within 7 days of one another. The groups of sows and their litters assigned to pasture nursery systems were moved to 0.2-acre pasture lots at 1, 2, or 3 weeks after farrowing. The lots contained either trees for shade or an inexpensively constructed tin-roofed shade, figure 2. Sows were fed with a self-feeder and the pigs had access to creep feeders. The pigs were given an iron dextran injection 2 days after birth, vaccinated for atrophic



**FIG. 2.** The type of inexpensive shades used in the pasture lots.

rhinitis at 7 and 21 days of age, and given injections of a long-acting terramycin at 2, 7, 14, and 21 days of age.

The pigs were weaned at 49 days of age and all pigs were treated alike and put in concrete floored pens until the end of the test at 70 days of age.

The traits studied were litter sizes and litter weights at 21, 49, and 70 days of age and pig survival rates and weights at these same three ages.

Sows were exposed to the boars at 20 and 15 days after farrowing in farrowing groups 1 and 2, respectively. This allowed the sows to be bred in a pen mating situation to determine if the sows could be mated successfully during lactation, Figure 3. The traits evaluated from this part of the study were the percentage of the sows that conceived, the number of days after farrowing, when conception occurred, and the litter size of the litter conceived during the previous lactation. The date of conception used to calculate the number of days after farrowing was estimated by assuming that the gestation length was 114 days if the sow farrowed. The sows



**FIG. 3. Sows were pen mated to boars during the lactation period.**

in farrowing group 1 were slaughtered and the age of the fetuses at slaughter was estimated from the crown-rump length of the fetuses.

## **RESULTS**

The litter size at 21 days of the pigs kept in confinement was larger than the litter sizes of those litters put on pasture at 1 and 2 weeks after farrowing, table 1. However, at 49 days and 70 days of age, the litter sizes were not significantly different among the four treatment groups. In fact, the litter size at 49 and 70 days of those litters put on pasture at 3 weeks of age was equal to those litters that remained in confinement. The average of the three pasture systems was only 0.2 to 0.3 pig less than the confinement nursery system. A similar pattern emerged for litter weights of the four treatment groups, table 2. At 21 days, the litter weights were heavier for the litters reared in the confinement treatment but no significant differences were noted at 49 and 70 days. Only 17.3 pounds separated the best treatment group (pasture

TABLE 1. AVERAGE LITTER SIZES AT 21, 49, AND 70 DAYS FOR A CONFINEMENT AND THREE PASTURE NURSERY SYSTEMS

Nursery system <sup>1</sup>	Litter sizes at <sup>2</sup>		
	21 days	49 days	70 days
Confinement .....	8.7 <sup>b</sup>	8.1	8.0
Pasture-1 week .....	8.0 <sup>c</sup>	7.7	7.7
Pasture-2 weeks .....	7.9 <sup>c</sup>	7.5	7.5
Pasture-3 weeks .....	<sup>3</sup>	8.1	8.0

<sup>1</sup> Number of litters in each of the four nursery systems was 16, 16, 16, and 18, respectively.

<sup>2</sup> Means within a column with different superscripts differ from the confinement nursery system ( $P \leq .05$ ).

<sup>3</sup> Litters at 21 days from this nursery system were included with the confinement nursery system as the pasture-3 weeks system was not in effect at this time.

TABLE 2. AVERAGE LITTER WEIGHTS AT 21, 49, AND 70 DAYS FOR A CONFINEMENT AND THREE PASTURE NURSERY SYSTEMS

Nursery system	Litter weights at		
	21 days	49 days	70 days
Confinement .....	<i>Lb.</i> 89.9	<i>Lb.</i> 220.8	<i>Lb.</i> 354.3
Pasture-1 week .....	81.0	206.4	342.4
Pasture-2 weeks .....	81.2	204.1	349.6
Pasture-3 weeks .....	<sup>1</sup>	209.4	359.7

<sup>1</sup> Litters at 21 days from this nursery system were included with the confinement nursery system as the pasture-3 weeks system was not in effect at this time.

at 3 weeks) from the poorest treatment group (pasture at 1 week) for litter weight at 70 days of age.

The pig survival rates agreed with the litter size data, that is, at 21 days, pigs reared in confinement had higher survival rates than pigs moved to the pasture nursery system at 1 and 2 weeks of age. However, at 49 and 70 days of age, pigs reared in confinement and those moved to the pasture nursery at 3 weeks had similar survival rates of 7 to 9 percent higher than the survival rate of pigs moved to the pasture nursery at 1 and 2 weeks, table 3. This would indicate that the death loss associated with being outside is greater in pigs moved at younger ages. Little death loss was found in pigs that went to the pasture nursery at 3 weeks of age. These results indicate that pigs moved to pasture systems at three weeks of age are better able to withstand the changes in weather that are associated with outdoor nursery systems. Weights of the pigs at 21, 49, and 70 days did not differ significantly among the four nursery systems, table 4.

Thirty-six percent of the sows did successfully conceive during the lactation phase. However, no significant differences among the four nursery systems were found for this trait,

table 5. Since the sows were pen or pasture mated, it is not known how many sows successfully mated with the boars but did not conceive. Although some sows will breed during lactation, the percentage is not high enough to recommend this procedure for commercial producers. The number of days after farrowing that conception took place ranged from 36 to 45 days for the four nursery systems. These differences were not significant. Litter sizes of those litters conceived during lactation did differ significantly. The sows that were

TABLE 3. AVERAGE PIG SURVIVAL RATES AT 21, 49, AND 70 DAYS OF AGE FOR A CONFINEMENT AND THREE PASTURE NURSERY SYSTEMS

Nursery system	Pig survival rates at <sup>2</sup>		
	21 days	49 days	70 days
	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>
Confinement .....	98 <sup>b</sup>	91	91
Pasture-1 week .....	89 <sup>c</sup>	85	85
Pasture-2 weeks .....	89 <sup>c</sup>	84	83
Pasture 3 weeks .....	<sup>3</sup>	91	90

<sup>1</sup> Number of pigs alive at the beginning of the study for the four nursery systems was 148, 135, 145, and 161, respectively.

<sup>2</sup> Means within a column with different superscripts differ from the confinement nursery system ( $P \leq .05$ ).

<sup>3</sup> Pigs at 21 days from this nursery system were included with the confinement nursery system as the pasture-3 weeks system was not in effect at this time.

TABLE 4. AVERAGE PIG WEIGHTS AT 21, 49, AND 70 DAYS OF AGE FOR CONFINEMENT AND THREE PASTURE NURSERY SYSTEMS

Nursery system <sup>1</sup>	Pig weights at		
	21 days	49 days	70 days
	<i>Lb.</i>	<i>Lb.</i>	<i>Lb.</i>
Confinement .....	10.3	27.2	44.1
Pasture-1 week .....	10.5	28.3	46.5
Pasture-2 weeks .....	10.2	27.4	46.5
Pasture-3 weeks .....	<sup>2</sup>	25.7	44.5

<sup>1</sup> Number of pigs finishing test at 70 days for the four nursery systems was 133, 113, 123, and 144, respectively.

<sup>2</sup> Pigs at 21 days from this nursery system were included with the confinement nursery system as the pasture-3 weeks systems was not in effect at this time.

TABLE 5. PERCENT OF SOWS BRED DURING LACTATION, NUMBER OF DAYS INTO LACTATION, AND SUBSEQUENT LITTER SIZE OF THOSE BRED

Nursery system <sup>1</sup>	Percent bred	No. of days into lactation	Litter size of sows bred
Confinement .....	25	36.2	12.3 <sup>b</sup>
Pasture-1 week .....	37	44.6	11.3 <sup>b</sup>
Pasture-2 weeks .....	44	39.4	10.5 <sup>b,c</sup>
Pasture-3 weeks .....	37	39.8	8.0 <sup>c</sup>

<sup>1</sup> Number of sows that conceived for the four nursery systems was 4, 7, 7, and 6, respectively.

<sup>2</sup> Means within a column with different superscripts differ ( $P \leq .05$ )

moved to pasture at 3 weeks had smaller litter sizes for their next pregnancy than those that were moved to the pasture at 1 week post-farrowing or compared to those sows that remained in confinement.

## **MANAGEMENT OF SOWS AND PIGS OUTSIDE**

To put sows and litters outside requires producers to have available clean ground (no internal parasites) or have an anthelmintic (wormer) in the feed. An anthelmintic was included in the creep feed because the pasture lots were not clean, and the success of this management procedure was indicated in that there were no differences in weights and survival rates of pigs on the pasture nursery system compared to the confinement nursery system. Suitable shade and water for sows in hot summer months should also be available. Since there was not a sprinkler system in the pasture lots, wallows were built to keep the sows as comfortable as possible during these hot months. Although the weather factor is unknown, the performance of pigs may be affected when moved to the pasture lots at a young age. Therefore, every attempt was made to move the pigs to pasture when the weather forecast was for warm and dry weather the day following the move to minimize the stresses associated with rain and/or cool weather on the pigs and allow them to adapt more easily to their new environment.

When using the pasture nursery systems, good management of the sows and their litters was practiced. This system of raising pigs does not reduce the work load or management needed in keeping the pigs and sows healthy and comfortable.

## **CONCLUSIONS**

Since the performance of litters and pigs reared on pasture compared to litters and pigs reared in confinement did not differ significantly at 70 days of age, production costs, at least during the summer months, could be reduced because nursery facilities would not be needed. This would allow the producer the option of not constructing a confinement nursery. Also, because sows and their litters could be moved from the farrowing facilities from 1 to 3 weeks after farrowing to the pasture lots without a significant reduction in performance at 70 days, it would be possible to use the farrowing facilities more frequently than would normally be the case with 4- to

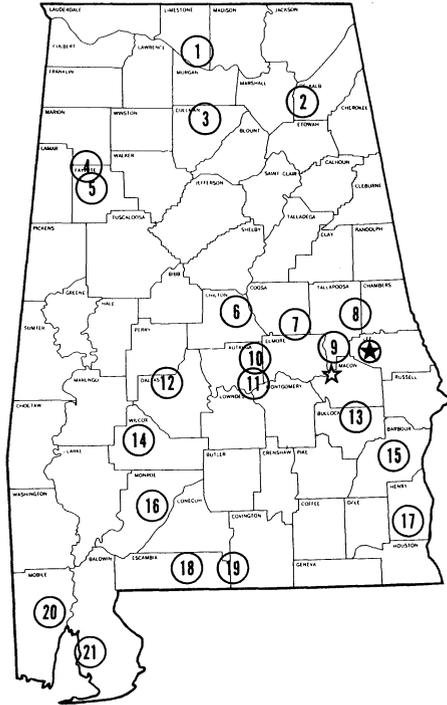
7-week weaning, thereby reducing the cost per pig produced for the existing farrowing facilities. Because of the desirable climate found in Alabama and the Southeast, the use of swine buildings can be reduced during the nursery and growing-finishing periods to decrease per pig costs of production and make swine producers of this area more competitive with others in the swine business. This system of raising pigs is not warranted for all producers, but it could allow producers to enter swine production or expand with lower capital outlay.



# Alabama's Agricultural Experiment Station System

## AUBURN UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



### Research Unit Identification

- ★ Main Agricultural Experiment Station, Auburn.
- ☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Chilton Area Horticulture Substation, Clanton.
7. Forestry Unit, Coosa County.
8. Piedmont Substation, Camp Hill.
9. Plant Breeding Unit, Tallahassee.
10. Forestry Unit, Autauga County.
11. Prattville Experiment Field, Prattville.
12. Black Belt Substation, Marion Junction.
13. The Turnipseed-Ikenberry Place, Union Springs.
14. Lower Coastal Plain Substation, Camden.
15. Forestry Unit, Barbour County.
16. Monroeville Experiment Field, Monroeville.
17. Wiregrass Substation, Headland.
18. Brewton Experiment Field, Brewton.
19. Solon Dixon Forestry Education Center, Covington and Escambia counties.
20. Ornamental Horticulture Substation, Spring Hill.
21. Gulf Coast Substation, Fairhope.