

# The Effect of Housing System and Physical Environment on Post-weaning Pig Performance

Michael E. Larson, graduate research assistant,  
Mark S. Honeyman, associate professor,  
Department of Animal Science

## Introduction

Many small independent pork producers have shown interest in low-cost alternative production systems for raising market pigs. One low-cost alternative production housing type that is gaining popularity is the bedded hoop structure. Hoop structures are primarily used as finishing facilities, but may also be used for gestation housing, breeding and isolation facilities, gilt development and bedding storage.

Recently, a new concept called wean-to-finish has been adopted by the swine industry. This unique approach is the adaptation of technologies used in the nursery and grow/finish phase into a single-stage production system. Bedded hoop structures may work as a wean-to-finish housing system, if nursery pigs can efficiently grow throughout the various seasonal temperature extremes.

The objectives of this study were to evaluate the growth performance of nursery pigs in hoop structures compared with those raised in confinement nurseries.

## Materials and Methods

A series of six trials involving 1,440 nursery pigs was conducted at two Iowa State University research farms from December 1999 to August 2000. Three small-scale hoop structures (20 × 36 ft) were constructed and divided lengthwise to form two pens (10 × 15 ft) per building for a total of six pens. Six pens (5.6 × 13.1 ft) in a fully-enclosed mechanically-ventilated confinement nursery were used for the comparison. In each trial, 240 crossbred pigs were weaned at 18 to 22 days of age and allotted

by weight and litter to six pens found in either the hoop (n=120) or confinement (n=120) nursery facility. For the trials during cold seasons, hovers with heat lamps were placed in each hoop pen to provide additional heat and protection from drafts. Four commercial diets were fed in sequence for the duration of each 5-week trial. During week 1, week 2, week 3, and weeks 4 and 5, the pigs were fed diets 1, 2, 3, and 4, respectively.

## Results and Discussion

Table 1 contains the results for pig weight, average daily gain (ADG), average daily feed intake (ADFI), and feed to gain (F:G) for pigs in both housing systems, averaged over the seasons, and individually for the winter, spring, and summer seasons.

Overall (weeks 1-5), the pigs in confinement grew faster ( $P<.003$ ), consumed more feed ( $P<.001$ ), and were less efficient ( $P<.001$ ) than pigs reared in hoop structures, regardless of season. The overall ADG was higher for pigs in confinement than pigs in hoop structures during the winter and spring ( $P<.05$ ). Regardless of season the overall ADFI was higher for pigs in confinement than for pigs reared in hoop structures ( $P<.05$ ). Overall, the pigs in hoop structures were more efficient during the winter and summer seasons, with similar feed efficiencies in the spring ( $P<.05$ ).

Across all seasons, the pigs in confinement grew faster and consumed more feed during the first two weeks post-weaning. During the first two weeks post-weaning, the pigs in hoop structures were more efficient than pigs in confinement for the winter and summer seasons.

### Implications

Hoop structures can be used as nursery facilities throughout the various seasons. The first two weeks post-weaning were shown to be a critical period for the pigs to acclimate to the variable hoop environment. After this period, the hoop pigs' growth performance was similar to the confinement pigs'. Hovers were helpful in minimizing drafts and improving the environment for the young pigs. Overall, pig performance may be similar during the various

seasons if producers can offset the lag shown during the first two weeks post-weaning.

### Acknowledgments

The authors wish to express their appreciation to the Leopold Center for Sustainable Agriculture; to Dennis Kent and the ISU Lauren Christian Research Farm staff, Atlantic, IA; and to Wayne Roush and the ISU Western Research Farm Staff, Castana, IA.

**Table 1. Performance of early weaned pigs in hoops and confinement during various seasons.**

Item	Seasons								
	Winter		Spring		Summer		All Seasons		
	Housing System		Housing System		Housing System		Housing System		
	Hoop	Conf	Hoop	Conf	Hoop	Conf	Hoop	Conf	Prob.
No. of pigs	237	237	239	238	237	238	713	713	—
Initial age, d	20.3 <sup>b</sup>	20.4 <sup>b</sup>	20.7 <sup>a</sup>	19.4 <sup>c</sup>	20.7 <sup>a</sup>	20.2 <sup>b</sup>	20.6	20.0	.001
Final age, d	55.3 <sup>b</sup>	55.4 <sup>b</sup>	55.7 <sup>a</sup>	54.4 <sup>c</sup>	55.7 <sup>a</sup>	55.2 <sup>b</sup>	55.6	55.0	.001
Weight, lb									
Initial	6.08 <sup>f</sup>	6.60 <sup>e</sup>	7.09 <sup>a</sup>	6.75 <sup>d</sup>	7.04 <sup>b</sup>	6.86 <sup>c</sup>	6.74	6.74	.94
Ending	18.64 <sup>k</sup>	19.78 <sup>j</sup>	20.86 <sup>h</sup>	21.55 <sup>g</sup>	20.62 <sup>h,i</sup>	20.15 <sup>i,j</sup>	20.04	20.49	.003
Daily gain, lb									
Week 1-2	177	192	188	254	168	210	178	219	
Week 3-5	478	499	530	535	534	492	514	508	
Overall	358 <sup>d</sup>	376 <sup>c</sup>	393 <sup>b</sup>	422 <sup>a</sup>	387 <sup>b,c</sup>	379 <sup>b,c</sup>	380	392	.003
Daily feed, lb									
Week 1-2	251	292	272	359	273	324	265	326	
Week 3-5	783	849	876	879	817	836	823	855	
Overall	569 <sup>d</sup>	627 <sup>b</sup>	635 <sup>b</sup>	672 <sup>a</sup>	596 <sup>c</sup>	631 <sup>b</sup>	601	644	.001
Feed:Gain,									
Week 1-2	1.41	1.52	1.44	1.41	1.62	1.54	1.49	1.49	
Week 3-5	1.64	1.70	1.65	1.64	1.53	1.70	1.60	1.68	
Overall	1.59 <sup>b</sup>	1.68 <sup>c</sup>	1.62 <sup>b</sup>	1.59 <sup>b</sup>	1.54 <sup>a</sup>	1.66 <sup>c</sup>	1.58	1.64	.001

<sup>abcdef</sup>LSMeans in the same row with different superscripts differ (P<.05).

<sup>ghijkl</sup>LSMeans in the same row with different superscripts differ (P<.01).

Statistics were reported on overall means only.