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Nursery and Growing-Finishing Space Interactions

Mike Brumm
Jim Dahlquist¹

The reductions in feed intake and daily gain as space is restricted have been clearly documented for pigs in nursery and growing-finishing facilities. The general management recommendation has been to provide sufficient space for maximum performance (daily gain) in nurseries while often restricting space in growing-finishing facilities for best economic performance. However, as female reproductive performance within a herd increases, there often is more crowding of weaned pigs in the nursery. The effect of this crowding on subsequent performance has not been determined.

This experiment was designed to investigate the possible interaction of nursery space allocation and growing-finishing space allocation on performance from weaning to slaughter.

Experimental Procedure

In each of two trials, 144 crossbred weaned pigs (24 ± 3 d of age) were purchased from a single source and transported 12 miles to the University of Nebraska Northeast Research and Extension Center swine unit within 2 hours of weaning.

Pigs were eartagged, weighed, blocked by weight into two groups. Equal number of barrows and gilts were

randomly assigned within weight group to experimental treatments.

In the nursery phase, pigs were housed either 12 (UN) or 18 (CN) pigs per 4 ft \times 8 ft deck (2.7 vs 1.8 ft²/pig). Each deck had two nipple drinkers. There was one feeder space for every two pigs in both treatments. For the first week after weaning, air temperature in the pig zone was maintained at 86° F. Beginning one week after weaning, thermostat settings were reduced 3.6° F per week. From 7:00 p.m. to 7:00 a.m., thermostat settings were reduced an additional 10 to 11° F.

After the five-week nursery period, all pigs were moved to a partially slatted, fan ventilated growing-finishing facility. Within nursery space treatments, pigs were blocked by weight and sex into three groups and were randomly assigned within weight group to the growing-finishing space treatments of either 10 (UGF) or 14 (CGF) pigs per pen (8.4 vs 6.1 ft²/pig). Each growing-finishing pen had one nipple drinker and three feeder holes. Sprinklers were provided for summer heat relief and pen sizes were not adjusted when a pig died or was removed from the experiment for unsatisfactory performance.

On the week individual pigs weighed 230 pounds or greater, they were slaughtered at SiouxPreme Packing Co. in Sioux Center, Iowa. Total Body Electrical Conductivity was used

Table 1. Effect of nursery space allocation on weaned pig performance (least squares means).

	Treatment ^a	
	CN	UN
No. pens	8	12
No. pigs	144	144
Pig weight, lb		
Initial	14.6	14.7
35 d ^b	42.7	46.1
Average daily gain, lb ^b	.80	.90
Average daily feed, lb ^b	1.34	1.51
Feed:gain	1.67	1.67
Pigs dead/removed, no.	0	1

^aCN = 18 pigs/pen (1.8 ft²/pig); UN = 12 pigs/pen (2.7 ft²/pig)

^bMeans differ $P < .001$.

on individually identified pigs to provide an estimate of carcass lean.

At weaning, all pigs were offered a commercial, pelleted starter (1.4% lysine) until the week the individual pen weight was 23 lb or greater. They were then offered a 1.15% lysine diet formulated with corn and soybean meal and 3% added fat for the duration of the nursery phase of the experiment.

During the growing-finishing phase, all corn-soy diets contained 3% added fat and were formulated to contain 0.9% lysine to 90 lb live weight, 0.8% lysine from 90 to 180 lb and 0.7% lysine from 180 lb to slaughter.

Results

Table 1 presents the results of the nursery phase of the experiment. There were no trial by treatment or weaning



Table 2. Effect of nursery and grow-finish space allocations on grow-finish performance.

Item	Treatment ^a				Probability levels for contrasts among means		
	CN		UN		CNUGF vs CNCGF (1 vs 2)	UNUGF vs UNCGF (3 vs 4)	CNCGF vs UNCGF (2 vs 4)
	UGF (1)	CGF (2)	UGF (3)	CGF (4)			
No. pens	6	6	6	6			
No. pigs	60	84	60	83			
Pig weight, lb							
Final	242.3	241.3	244.9	237.1	NS ^c	<.0005	<.05
Average daily gain, lb	1.87	1.80	1.91	1.72	.075	<.0001	<.05
Average daily feed, lb	5.70	5.57	5.86	5.42	NS	<.005	NS
Feed:gain	3.05	3.10	3.07	3.15	NS	NS	NS
Carcass lean, % ^b	46.3	47.7	46.3	47.8	< .01	<.005	NS
Lean gain, lb/d	.66	.66	.67	.63	NS	<.05	NS
Pigs dead/removed, no.	1	3	3	3			

^aCN = 18 pigs/nursery pen (1.8 ft²/pig); UN = 12 pigs/nursery pen (2.7 ft²/pig); UGF = 10 pigs/GF pen (8.4 ft²/pig); CGF = 14 pigs/GF pen (6.1 ft²/pig).

^bContaining 5% fat.

^cNot significantly different ($P > .1$).

weight block by treatment interactions so the results are presented for the main effect of space treatment. Similar to previously reported results from numerous researchers, putting more pigs in a nursery pen (less space per pig and more pigs per social group) resulted in reduced feed intake, reduced daily gain, and a 3.4 lb lighter pig from the nursery at 35 days postweaning.

Table 2 presents the results of the growing-finishing phase of the experiment. Similar to the nursery phase, there were no trial by treatment interactions so only main effects are presented. When pigs were crowded in the nursery (CN), there was no significant effect of crowding in the growing-finishing

phase (CGF vs UGF) on average daily feed (5.57 vs 5.70 lb/d) or feed conversion (3.10 vs 3.05). However, carcass % lean was greater in the crowded pigs (47.7% vs 46.3%) and daily gain was less (1.80 vs 1.87 lb/d). Therefore, there was no difference in the rate of lean gain (.66 vs .66 lb/d).

When uncrowded nursery pigs (UN) were moved to the growing-finishing facility, crowding (UNCGF) significantly reduced average daily gain (1.72 vs 1.91 lb/d), daily feed intake (5.42 vs 5.86 lb/d), carcass % lean (46.3% vs 47.8%) and the rate of lean gain (.63 vs .67 lb/d) compared to uncrowded pigs (UNUGF).

Based on these results, we

conclude that space (group size and pen space) allocation in the nursery phase affects the response of growing-finishing pigs to space restrictions. Especially evident is the depression in growing-finishing performance reported for uncrowded nursery pigs that were crowded in growing-finishing facilities compared to the performance of crowded nursery pigs that were subsequently crowded in growing-finishing facilities.

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