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Effect of Floor Space Allocation on Barrow Performance to 300 Pounds

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Summary and Implications

One hundred eighty barrows (12/pen) were given space allocations of 7, 9, and 11 ft²/pig from 43 to 300 lb. There was no effect of space allocation on daily feed intake, lean gain, or carcass backfat depth. Pigs given 9 ft² grew fastest while pigs given 7 ft² had the best feed conversion. Daily gain and feed efficiency were worst when pigs were given 11 ft²/pig. Results from this experiment will be useful to producers as they make space allocation decisions for pigs finished at weights heavier than the current U.S. average of 245 to 250 lb.

Introduction

Average sale weights of butchers to U.S. packers are increasing. The average market hog sale weight for farrow-finish cooperators on the Iowa State University Swine Enterprise Records program in 1985 was 233 lb. In 1994, cooperators on the Iowa and Nebraska Enterprise program reported a sale weight of 246 lb.

Space recommendations for growing-finishing pigs usually suggest 8 ft² per pig to market weight. However, the optimum space allocation for pigs raised to heavy weights is unknown. With many producers currently having average sale weights approaching 270 lb, an experiment was designed to investigate the effects of space allocation to a final weight of 300 lb.

Table 1. Effect of floor space allocation on pig performance.

	Floor space (ft²/pig)			P values	
Item[a]	7	9	11	Linear	Quadratic
No. pens	5	5	5		
Pig weight, lb					
Initial	43.0	43.1	43.2		
29 d	92.4	92.0	90.6	< .075	NS[b]
99 d	233.6	237.6	229.2	< .1	<.05
Final	298.8	301.3	296.6	NS	NS
CV, within pen wt	8.2	6.9	7.9	NS	< .1
ADG, lb/d					
0 to 29 d	1.71	1.69	1.64	< .05	NS
0 to 99 d	1.93	1.96	1.88	< .1	< .05
Overall	1.85	1.89	1.82	NS	< .1
ADFI, lb/d					
0 to 29 d	3.28	3.31	3.26	NS	NS
0 to 99 d	5.35	5.50	5.31	NS	< .05
Overall	5.76	5.93	5.83	NS	NS
Feed/gain					
0 to 29 d	1.92	1.96	1.99	NS	NS
0 to 99 d	2.78	2.80	2.82	NS	NS
Overall	3.11	3.15	3.21	< .075	NS
Carcass last rib midline					
backfat depth, in	1.31	1.36	1.35	NS	NS
Lean gain, lb/d[c]	.65	.66	.65	NS	NS

[a]CV = coefficient of variation, ADG = average daily gain, ADFI = average daily feed intake, and Feed/gain = feed efficiency.
[b]NS = not significant (P > .1)
[c]5 % fat basis.

Experimental Procedure

One hundred eighty barrows were purchased from a single source. At arrival, all pigs were weighed, eartagged, and assigned to experimental space allocations on the basis of five weight outcome groups. Within outcome group, barrows were randomly assigned to the space allocation treatments of 7, 9, or 11 ft²/pig.

There were 12 pigs per pen and the space occupied by the feeder was subtracted from the total pen space in the determination of space treatments. If a pig died or was removed during the experiment, pen size was adjusted to maintain the correct space allocation per pig. Pigs were individually re-

moved for slaughter during the week that they weighed 300 lb or greater and pen size was not adjusted thereafter.

Pigs were housed in a fully slatted, naturally ventilated, confinement facility. Each pen contained a two-hole self feeder and two nipple drinkers. Sprinklers were used for summer heat relief and were set to begin intermittent sprinkling when air temperatures in the facility reached 80°F.

Corn-soybean meal diets in meal form were formulated to contain 1.1, 1.0, .9, .8, and .7% lysine and were changed during the week average pig weight in individual pens achieved target weights of 100, 150, 200, and 250 lb, respectively.

Results and Discussion

On day 29 of the experiment, there was a linear decrease (P<.075) in pig weight and average daily gain (ADG) with increasing space (Table 1). By the 99-day weigh period, there were significant quadratic responses for pig weight, ADG, and average daily feed intake (ADFI) with the pigs given the intermediate space allocation of 9 ft^2/pig having the best performance and those given 11 ft^2/pig having the poorest performance.

The week all pigs in the facility averaged 242 lb (day 106 of the experiment), erysipelas was diagnosed. Pigs were treated under veterinary supervision with penicillin and *Erysipelothrix rhusipathiae* bacterin. No deaths occurred and all pigs appeared to recover within one week.

Overall, there was a significant quadratic effect of space allocation on ADG with the pigs given 7, 9, and 11 ft^2 growing at 1.85, 1.89, and 1.82 lb/d, respectively. No effect of space allocation on overall ADFI was detected. Feed/gain ratios worsened (P<.075) with increasing space allocations. There was no effect of space allocation on carcass backfat depth or rate of lean gain.

Uniformity of gain within pens of 12 pigs was estimated by calculating the coefficient of variation (CV) of individual pig weights within a pen when the first pig was removed at 300 lb or greater. A significant quadratic response was observed, with the least variation (CV = 6.9) in pens that provided 9 ft^2/pig while the most variation (CV = 8.2) was noted in pens that provided 7 ft^2/pig.

In this experiment, the highest ADG occurred when pigs were given 9 ft^2, while the best feed efficiency occurred at 7 ft^2. The worst pig performance (ADG and feed conversion efficiency) occurred when pigs were given the most space (11 ft^2/pig). These results suggest that barrows finished to weights approaching 300 lb require no more than 9 ft^2/pig to maximize ADG and possibly less to maximize feed conversion efficiency or gain per ft^2 of pen space.

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