

# Effects of Housing Finishing Pigs in Varying Group Sizes and Space Allocations

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## Summary

A study was conducted to determine whether the amount of space required by large groups differed from that of small groups, and whether space restriction affected pigs in large groups to the same extent as it does pigs in small groups. Some behavioural variables suggested that pigs in large groups were able to use space more efficiently. However, overall productivity and health variables indicated that pigs in large and small groups were similarly affected by crowding.

## Introduction

Past studies on small groups (10-40) of pigs have found a negative impact of crowding on productivity and welfare. Studies examining large group (> 40) housing have found setbacks in the growth rate of pigs soon after mixing. Research on the effects of crowding pigs housed in large groups is minimal, although it has been hypothesized that pigs housed in large groups are able to use space more efficiently. This study was designed to assess the space requirements of both large and small groups, and the effects of space restriction on pig performance, behaviour, physiology, health and welfare.

## Experimental Procedures

Group sizes were large (108 pigs) or small (18 pigs) and space allowances were crowded (0.52 m<sup>2</sup>/pig) or uncrowded (0.78 m<sup>2</sup>/pig), creating four treatments: large crowded, large uncrowded, small crowded, and small uncrowded. Eight 8-week blocks were carried out. A 1:1 ratio of barrows and gilts were used in the first two blocks. The remaining six blocks used barrows only. One wet/dry

ad-libitum feeder space was provided for every nine pigs. Gains, feed intake, and feed efficiency were calculated on a weekly basis. Postural and feeding behaviour were assessed on a biweekly basis, as were injuries and salivary cortisol concentrations (indicative of stress). Carcass and adrenal gland data were collected at slaughter. Pig morbidity and mortality were determined for all eight blocks.

## Results and Discussion

Crowded pigs had a lower growth rate, a lower feed efficiency, and a lower final body weight than uncrowded pigs (Table 1). Growth rate was depressed by 9.8 %, and feed efficiency by 11 %, during the final week of the study ( $P < 0.05$ ). Crowded pigs ate fewer meals and spent less time eating overall, but feed intake did not differ from that of uncrowded pigs. Space allowance did not affect the level of injury, morbidity, or stress.

*“Crowded pigs had a lower growth rate, lower feed efficiency, and a lower final body weight than uncrowded pigs.”*

Pigs in large groups had a lower growth rate than pigs in small groups (Table 1). Gains were most affected during the first two weeks, at which time they were depressed by 5.4 % ( $P < 0.05$ ). The difference in initial body weights (Table 1) indicated that growth depression began in the first four days after group formation. Pigs housed in large groups ate fewer meals, but took longer to eat each meal, than pigs in small groups. Pigs housed in large groups had higher lameness and leg injury scores than pigs in small groups. Pigs in small groups spent more time sitting and lying on their sternum, and less time lying on their side, than pigs in large groups. Group size did not affect morbidity or stress levels.

The first sign of growth depression in response to crowding occurred much sooner for pigs in large groups compared with pigs in small groups. However, the rate of depression in gains was more gradual for pigs in large groups. Thus, by the final week of the trial, pigs in both large and small crowded groups had similar gains. Pigs in the small uncrowded groups had the highest carcass lean percentage while pigs in the large uncrowded groups had the highest fat depth. Pigs in large crowded groups had the highest lameness scores.

**Table 1.** Initial and final body weight, coefficient of variation, gains, feed intake, and feed efficiency of grow-finish pigs housed in large or small groups and at crowded or uncrowded space allowances

Item	Treatments				SEM	P-value <sup>a</sup>		
	Small Uncrowded	Small Crowded	Large Uncrowded	Large Crowded		Space Allowance	Group Size	Space x Group Size
# Pigs/Experimental Unit	36	36	108	A108	-	-	-	-
# Experimental Units/Block <sup>b</sup>	1	1	1	1	-	-	-	-
Space Allowance, m <sup>2</sup> /pig	0.78	0.52	0.78	0.52	-	-	-	-
Initial Body Weight <sup>c</sup> , kg	38.01	38.02	36.55	36.97	0.37	NS	0.003	NS
Coefficient of Variation, %	16.73	16.65	15.73	16.81	0.84	NS	NS	NS
Final Body Weight, kg	96.21	93.95	93.10	91.29	0.57	0.002	< .0001	NS
Coefficient of Variation, %	11.79	11.07	10.76	11.45	0.50	NS	NS	NS
Gain, kg/day	1.098	1.049	1.055	1.016	0.020	0.02	0.04	NS
Feed Intake, kg/day	2.782	2.867	2.766	2.801	0.066	NS	NS	NS
Efficiency, kg gain/kg feed	0.4108	0.3781	0.3807	0.3613	0.0080	0.002	0.005	NS

<sup>a</sup> NS = no significant difference (P > 0.05)

<sup>b</sup> Two adjacent small pens (18 pigs/pen) were equivalent to one experimental unit

<sup>c</sup> Taken after a habituation period of three days for blocks 1, 2, 6, and 8, four days for blocks 3, 4, and 5, and ten days for block 7

## Implications

Both crowding and large group housing were found to negatively affect pig performance. Pigs housed in large groups were affected by space restriction sooner than pigs in small groups although, the depression in growth was much more gradual for pigs housed in large groups. There was limited evidence, and none related to productivity, that pigs in large groups were able to use space more efficiently than pigs in small groups.

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