

GROWTH AND CARCASS COMPOSITION OF INDIVIDUALLY AND GROUP FED PIGS

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SUMMARY

The effects of *ad libitum* feeding either individually or in groups on the growth and carcass composition of 40 pigs were compared. Individually fed pigs grew and deposited fat faster than group fed pigs but no difference occurred in lean tissue growth rate in the ham. Individually fed pigs ate more often, had a higher voluntary feed intake than group fed pigs but both groups had similar feed conversion ratios. There was no significant correlation between ulceration of the pars oesophagus and daily gain in either group of pigs.

INTRODUCTION

A problem in piggeries is dealing with the slower growing pigs after their peers have been sold. To leave them in a pen is a waste of valuable space while to mix them with other pigs is likely to aggravate their slow growth rates. An alternative is to have a few individual stalls where the slower growers can be finished.

Studies at the University of Queensland have shown that there were differences between feeding methods on growth, lean tissue growth rate in the ham and fat depth in growing pigs. Pigs fed individually grew faster, deposited more fat but had a lower lean tissue growth rate in the ham than pigs fed in groups (Pattie, unpublished data). The objectives of the following study were to compare the growth and carcass composition of pigs fed *ad lib.* rations either individually or in groups and to identify the possible causes of growth differences in terms of feed intake, behaviour and incidence of oesophagogastric ulcers.

MATERIALS AND METHODS

The experiment was carried out at the University of Queensland Veterinary Science Farm at Pinjarra Hills. Forty Large White Landrace crossbred pigs (20 boars and 20 gilts) with an average live weight of 47 kg at the start of the experiment were used. Ten boars and ten gilts were randomly allocated to individual stalls and the remainder were allocated to four pens of five pigs each with sexes separated. A pelleted commercial diet was fed during the study. The pigs were fed *ad lib.* and were slaughtered at an average live weight of 87 kg. Pigs were weighed and their backfat measured ultrasonically at the P2 position (6.5 cm from the midline of the back at the last rib) every two weeks. Voluntary feed intake (VFI) was measured weekly for each group and individually for pigs in stalls and feed conversion ratios (FCR) calculated.

Behavioural observations were made twice weekly. Each observation was carried out from 0800 hours to 1200 hours noting their general activity, ingestive behaviour, agonistic interaction and contact between pigs in adjacent pens. Pigs' stomachs were collected at slaughter for assessment of ulceration of the pars oesophagea and scored on a scale of 1-7 (Blackshaw et al. 1980). Dissection of the left hind ham was used to assess carcass composition (Evans and Kempster 1979). The ham was separated into skin, subcutaneous fat, muscle, intramuscular fat and bone.

Lean tissue growth rate in the ham (LTGRH) was calculated by using the formula (Pattie, unpublished data) as follows.

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$$LTGH \text{ (g/d)} = 21.16 + 0.048 (\overline{GR_i} - \overline{GR}) - 0.023 (\overline{F_i} - \overline{F}) \text{ where}$$

$\overline{GR_i}$: Growth rate of pig i (g/d)
 $\overline{GR}$: Average growth rate of all pigs used (g/d)
 $\overline{F_i}$: Fat depth of pig i (mm)
 $\overline{F}$: Average fat depth of all pigs used (mm)

Two way analysis of variance with replication (Dokal and Rohlf 1969) was used except for ham composition data. The loss of one ham at the abattoir necessitated the use of analyses with unequal and disproportionate subclass numbers (Steel and Torrie 1960). The Chi-square test was used for analyses of data on ulceration in the pars oesophagus (Holman 1969).

RESULTS

Growth performance

Pigs fed individually had higher VFIs, grew faster and deposited fat faster than pigs fed in groups (Table 1). No significant difference occurred in LTGRH or FCR between feeding methods. Sex influenced FCR with boars converting feed more efficiently than gilts. Sex had no effect on growth rate, VFI, fat deposition or LTGH.

TABLE 1 Growth performance of pigs fed *ad lib.* individually and in groups

Attribute	Individual				Group			
	Boars		Gilts		Boars		Gilts	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Days to slaughter	42.2	2.1	45.0	2.3	52.0	0.0	52.0	0.0
Growth rate (kg/d)	1.01	0.03	0.89	0.04	0.87	0.03	0.75	0.03
Fat deposition rate (mm/d)	0.13	0.01	0.17	0.02	0.11	0.01	0.10	0.01
LTGRH (g/d)	21.2	0.10	21.0	0.13	21.1	0.16	21.3	0.13
VFI (kg/d)	3.1	0.10	3.0	0.13	2.7	-	2.6	-
FCR (kg feed/kg gain)	3.1	0.13	3.6	0.09	3.3	-	3.6	-

Carcass traits and ham composition

There were no significant differences between feeding methods for carcass percentage, carcass backfat and ham composition (Table 2). Gilts had higher percentages of subcutaneous fat and lower percentages of skin than boars. There was no interaction between sex and feeding method on ham composition.

TABLE 2 Carcass traits and ham composition of pigs fed *ad lib.* individually and in groups

Attribute	Individual				Group			
	Boars		Gilts		Boars		Gilts	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Carcass weight (kg)	67.9	0.6	67.2	1.0	67.3	1.7	62.5	1.7
Carcass percentage	76.0	0.5	77.4	0.3	74.9	0.9	76.4	1.9
Carcass backfat (mm)	16.4	0.8	16.9	0.7	17.7	1.0	17.6	1.0
Ham muscle (%)	67.0	0.7	64.1	0.9	66.6	0.9	64.4	0.6
" total fat (%)	17.3	0.5	21.3	1.0	18.0	0.7	20.4	0.5
" intramuscular fat (%)	2.4	0.2	2.7	0.3	3.1	0.3	2.5	0.9
" subcutaneous fat (%)	14.9	0.6	18.6	1.0	14.9	0.9	17.9	0.5
" skin (%)	4.5	0.4	3.8	0.2	4.6	0.2	3.8	0.2
" bone (%)	11.3	0.3	10.8	0.3	11.8	0.3	11.4	0.4

Behavioural activities

Individually stalled pigs fed more frequently (55 min/240 min period vs. 41 min/240 min period) but spent less time walking (1 min/240 min period vs. 27 min/240 min period) than pigs fed in groups. No significant differences between the two feeding methods occurred in the frequency of drinking, lying, standing/sitting and contact between pigs in adjacent pens.

Oesophagogastric ulcers

All stomachs except two had oesophagogastric ulcers with individually fed pigs having more severe ulceration. The average ulceration scores were 5.2 and 3.6 respectively. However, pigs fed individually grew faster (932 g/day vs. 782 g/day) than group fed pigs. There was no significant correlation between ulcer score and daily gain in pigs from either feeding method (Table 3).

TABLE 3 Correlation between ulcer score and daily gain in pigs fed *ad lib.* individually and in groups.

	Individual feeding (r)	Group Feeding (r)
Boars	-0.219	0.009
Gilts	0.405	-0.413
Boars and gilts	-0.029	0.052
Overall	0.231	

DISCUSSION

The results agree with previous observations in terms of growth rate with individually fed pigs growing faster (Pattie, unpublished data). A higher growth rate reduced the time to achieve slaughter weight in individually fed animals. This may be an advantage for the previously mentioned slow growers. Feeding method had no effect on carcass traits or ham composition. This is in agreement with previous results (Andaya *et al.* 1972; Murray *et al.* 1974).

Differences in overall growth rate and fat deposition between the feeding methods may be in part caused by the difference in VFI with individually fed pigs consuming more and thus having a higher frequency of feeding than group fed pigs. Other behavioural differences may also influence the growth differences. Pigs fed individually were unable to engage in agonistic interactions and had limited capacity for walking compared to the group fed pigs. This restriction may confer an overall energy saving for the individually stalled pigs. However, lack of exercise has not been found to increase weight gain or feed intake (Murray *et al.* 1974).

There was no significant correlation between ulcer score and growth rate of pigs fed either individually or in groups. Blackshaw *et al.* (1980) also found no significant correlation of ulcers with growth rate either with *ad libitum* or restricted feeding.

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