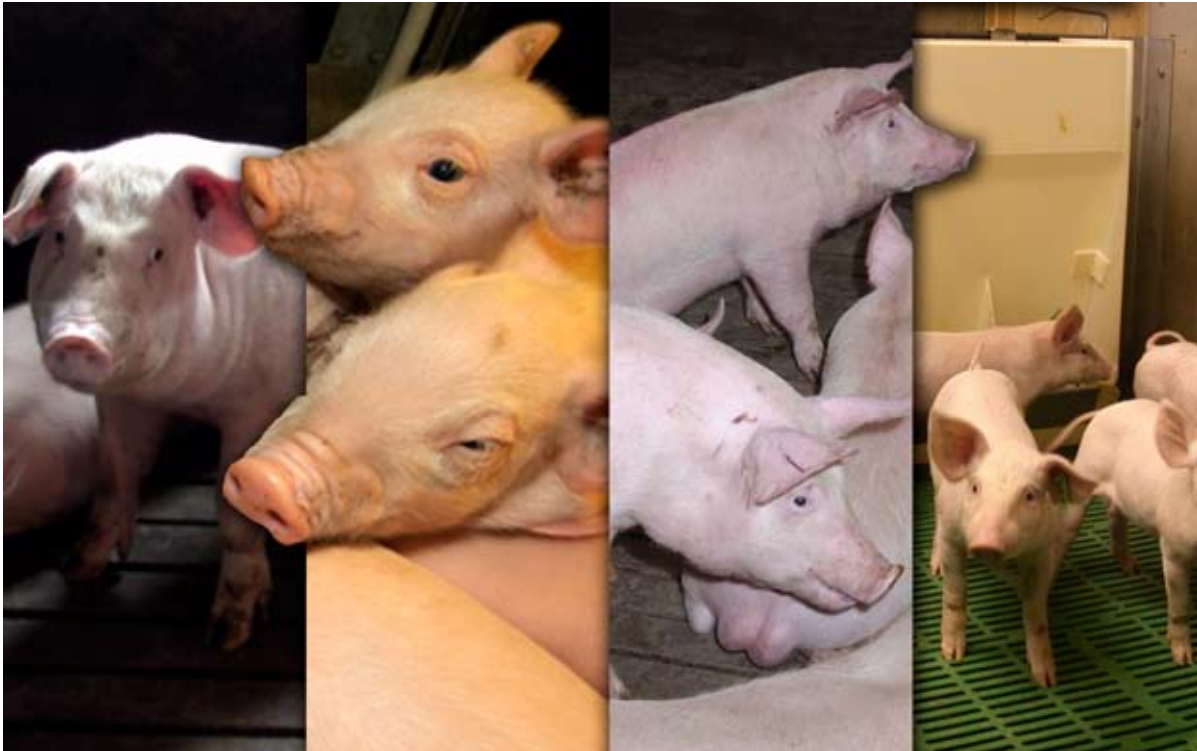


Providing additional wet feed for weaners



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1. EXECUTIVE SUMMARY

Immediately after weaning the growth rate of pigs normally drops dramatically. Feed intake falls until pigs familiarise themselves with the new systems and diets in place for feeding. Two ways which have been suggested to help pigs adapt to their new environment include: 1) offering feed in a liquid or 'wet' form and 2) offering feed in a highly accessible manner. The aim of this study was to assess whether providing additional wet feed at regular intervals in a highly accessible trough improves the performance of weaned pigs.

At weaning pigs were penned in groups of 15 and offered a dry pelleted feed through 2 single-space 'wet and dry' feeders. Additional wet feed was prepared using the dry pelleted feed mixed in a 2:1 ratio with water and this was offered from a metal trough for several days post weaning. The performance of pigs penned in a mixed weight group were also compared with the performance of pigs when they were housed in even weight groups e.g. all small pigs grouped together. Overall providing additional wet feed in a trough had no significant effect on growth rate during stage 1 and 2. In general feed 'intake' (or disappearance) increased when wet feed was offered via a trough but feed conversion ratio was poorer. There were no additional advantages found from offering small pigs wet feed in a trough when small pigs were grouped together. In addition, the above practice added labour and capital costs to the management system for no extra benefit.

2. INTRODUCTION

It has been suggested that one of the factors which leads to low feed intake by pigs during the post weaning period is difficulty adapting to a completely solid diet (Fraser *et al.*, 1998). A possible method of overcoming this is to provide piglets with liquid or 'wet' feed. This has been shown to stimulate feed intake in the post weaning period (Jensen and Mikkelsen, 1998). This increased intake may have additional benefits in terms of helping to maintain the digestive capacity of the gut which can decrease after weaning (Pluske *et al.*, 1997). One of the problems with liquid feeding, however, is poor food conversion due to high levels of wastage (Kornegay *et al.*, 1981).

Feed intake may also be stimulated in the post weaning period by manipulating the way in which feed is presented. Newly-weaned piglets may prefer to feed simultaneously at intervals as they did on the sow prior to weaning. This is not possible with some commercial feeders, however, which offer a limited number of individual feeding spaces. This may lead to problems with access to the feeder which may be exacerbated in groups of small pigs which appear to have a slower rate of eating (O'Connell *et al.*, 2001b).

The aim of this study was to assess whether providing additional wet feed at regular intervals in a highly accessible trough improves the performance of weaned pigs. In addition, the effect of providing additional wet feed for groups of small and large pigs was also assessed in order to determine whether the trough was of particular benefit to small rather than large pigs.

3. MATERIAL AND METHODS

3.1 Pre experimental treatment

All piglets were born in crated farrowing accommodation and were offered a commercially available creep feed from 10 days of age in a forward creep area. Piglets were weaned at 4 weeks of age and allocated to treatments.

3.2 Treatments

This experiment was carried out in two separate studies. In study A pigs were assigned to one of two treatments:

- (1) trough containing additional wet feed,
- (2) control treatment with no trough.

In study B pigs were assigned to one of four treatments:

- (1) small pigs (i.e. <8 kg on average) with access to trough,
- (2) small pigs with no access to trough,
- (3) large pigs (i.e. >10 kg on average) with access to trough,
- (4) large pigs with no access to trough.

3.3 Animals and housing

In study A, 240 pigs were mixed into groups of 15 animals at weaning. The groups were balanced for live weight, gender and litter and were assigned randomly to treatment. In study B, 360 pigs were mixed into groups of 15 at weaning and allocated to treatment. The groups were allocated to treatment ensuring that, within each weight category, treatments were balanced for gender, weight and litter.

The pigs were housed in pens measuring 1.1 x 3.5 m with plastic slatted floors. Between 4 and 7 weeks of age the pigs had access to a kennel area heated by a radiant heater. At 7 weeks of age the pigs were moved to identical pens (in the same building) but without the kennel area. The pigs remained here until the end of stage 2 at 11 weeks of age.

Each group of pigs was offered feed *ad libitum* from two single-space 'wet and dry' feeders. In the trough treatment, 150 g/day of the same feed was also available from a metal trough (length x width x height = 762 x 152 x 76 mm). The trough was placed in the feeding area of the pen (Figure 1) and was secured to the slats with bolts. The feed which was placed in the trough was mixed in a 2:1 ratio with water at ambient temperature and was added to the trough three times daily for 5 days post weaning in study 1, and for 4 days post weaning in study 2. The trough was cleaned out on each occasion before feed was added. In all treatments water was available from a nipple drinker in each single-space feeder and also from a nipple drinker mounted on the wall of the pen.

Diets offered between 4 and 7 weeks of age consisted of commercial starter and stage 1 feeds in pelleted form. From 8 to 11 weeks of age pigs were offered a pelleted cereal/soya based diet *ad libitum*. This contained 14.2 MJ DE/kg and 22% crude protein and was manufactured at the Agricultural Research Institute of Northern Ireland.

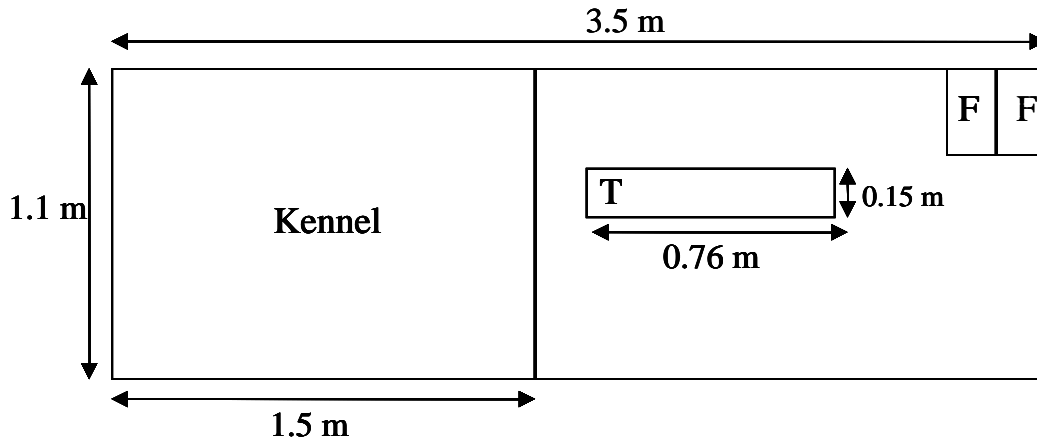


Figure 1 Layout of pen used during post-weaning period (T = trough containing wet feed, F = single-space 'wet and dry' feeders)

3.4 Measurements

Pigs were individually weighed at 4, 7 and 11 weeks of age, and feed intake was recorded daily for the first week after weaning and weekly thereafter until 11 weeks of age. Individual growth rates and group feed intake and food conversion ratios were calculated for stage 1 (4 to 7 weeks of age) and stage 2 (7 to 11 weeks of age). Average within-pen variations in daily liveweight gain was calculated for both treatments in study A between 4 and 11 weeks of age.

In addition, feeding behaviour at the single-space feeders was recorded for the first 5 days post weaning in study A using video recorders (2 frames per second). Video tapes were later analysed to determine the number of pigs feeding at the feeder at 10 minute intervals.

4. RESULTS AND DISCUSSION

4.1 Effects of providing additional trough

In both studies A and B there were no significant differences between the trough and control treatment in live weight at 4, 7 or 11 weeks of age, the mean values for both studies being 8.8, 15.6 and 33.6 kg respectively (Table 1).

In study A pigs with access to the additional trough showed higher levels of feed intake on days 1 and 4 post weaning than pigs without access to the trough ($P < 0.001$ and $P < 0.05$ respectively) (Table 2). There was also a trend for feed intake to be higher on days 2 and 3 post weaning when pigs had access to the additional trough compared to pigs without access ($P < 0.1$). Mean daily feed intake was 7% higher during stage 1 when pigs had access to the additional trough ($P < 0.05$).

Table 1 Mean live weight (kg) at 4, 7 and 11 weeks of age in studies A and B

Age	Treatment				Weight category			
	Control	Trough	s.e.m.	P	Heavy	Light	s.e.m.	P
<i>Study A</i>								
4 weeks	8.7	8.7	0.00	NS	-	-	-	-
7 weeks	15.3	15.2	0.13	NS	-	-	-	-
11 weeks	33.4	33.0	0.28	NS	-	-	-	-
<i>Study B</i>								
4 weeks	8.9	8.9	-	NS	10.1	7.6	0.01	<0.001
7 weeks	15.9	15.9	-	NS	17.3	14.5	0.17	<0.001
11 weeks	34.1	33.8	-	NS	35.9	32.0	0.34	<0.001

Table 2 The effect of providing additional wet feed in a highly accessible trough on the performance of pigs between 4 and 10 weeks of age in study A

	Control	Trough	s.e.m.	P
<i>Daily feed intake (g)</i>				
Day 1	15	34	1.9	<0.001
Day 2	40	55	5.8	NS
Day 3	80	107	9.3	NS
Day 4	124	156	10.2	<0.05
Day 5	164	158	12.2	NS
Day 6	195	177	14.0	NS
Day 7	218	218	11.1	NS
Stage 1	367	392	5.2	<0.05
Stage 2	1119	1059	28.6	NS
Stages 1 and 2	785	773	13.4	NS
<i>Daily liveweight gain (g)</i>				
Stage 1	343	321	14.0	NS
Stage 2	648	652	12.3	NS
Stages 1 and 2	515	510	4.6	NS
<i>Food conversion ratio</i>				
Stage 1	1.09	1.23	0.043	NS
Stage 2	1.73	1.63	0.053	NS
Stages 1 and 2	1.53	1.52	0.019	NS

In study B feed intake was significantly higher on days 1 and 2 post weaning when the additional trough was provided rather than in the control treatment ($P < 0.001$) (Table 3). However mean feed intake levels during stage 1 and stage 2 did not differ significantly between the trough and no trough treatments in study B.

Table 3 The effect of providing additional wet feed in a highly accessible trough and of size at weaning on pig performance in study B

	Feed		P	Size		s.e.m.	P
	Control	Trough		Large	Small		
<i>Food intake (g/day)</i>							
Day 1	15	34	<0.001	25	24	1.5	NS
2	45	69	<0.001	59	55	3.8	NS
3	102	103	NS	107	99	6.6	NS
4	149	155	NS	158	146	6.3	NS
5	178	168	NS	175	171	7.4	NS
6	211	215	NS	220	206	9.8	NS
7	269	262	NS	271	259	10.8	NS
Stage 1	398	400	NS	415	383	10.2	<0.05
Stage 2	1128	1089	NS	1146	1071	20.3	<0.05
Stages 1 and 2	817	796	NS	835	778	13.6	<0.01
<i>Growth rate (g/day)</i>							
Stage 1	348	350	NS	356	342	8.3	NS
Stage 2	677	664	NS	691	650	10.0	<0.05
Stages 1 and 2	537	530	NS	548	519	7.1	<0.05
<i>Food conversion ratio</i>							
Stage 1	1.15	1.15	NS	1.17	1.12	0.015	<0.05
Stage 2	1.67	1.65	NS	1.66	1.65	0.026	NS
Stages 1 and 2	1.52	1.50	NS	1.53	1.50	0.019	NS

Providing additional wet feed in a trough had no significant effect on growth rate during stages 1 or 2 in studies A or B. Within-pen variation in daily liveweight gain was similar between the trough and no trough treatments (0.0099 and 0.0125 kg/day² respectively) in study A. In addition, there was no significant effect of providing an additional trough on food conversion during stages 1 and 2 in studies A or B, however there was a 13% poorer food conversion ratio during stage 1 of study A in the trough treatment (Table 2).

These results show that providing additional feed in a highly accessible trough leads to modest increases in apparent feed intake during the immediate post-weaning period. It should be noted, however, that in the present study the term intake refers to the total amount of feed used and therefore includes both consumed and wasted feed. The fact that increased levels of apparent feed intake in the trough treatment in study A were not accompanied by increased growth rates suggests there was more feed wastage in this treatment. This is supported by the poorer food conversion ratio shown during stage 1 in study A. Previous research at this Institute has also shown greater wastage when feed was offered from shared troughs rather than single-space 'wet and dry' feeders (O'Connell *et al.*, 2001a). This increased wastage with the trough treatment in the present study appeared to be due to the pigs pushing the feed off the trough as there was rarely any feed left in the trough and it was rarely fouled in. It is possible that the lack of rooting substrate in the pens meant that pigs used the trough to perform rooting behaviour in addition to feeding (Beattie *et al.*, 2001).

Apparent feed intake from the trough accounted for 60, 57, 30, 20 and 17% of total apparent feed intake from days 1 to 5 respectively. This was reflected in a reduced average daily number of animals observed at the single-space feeders when pigs had access to a trough during the first week after weaning in study A (trough treatment: 5.7, control treatment 6.5, s.e.m. 0.24 pigs, $P < 0.05$) (values shown are square root values taken in order to normalise data). The decline shown in the proportion of feed used from the trough over the first 5 days post weaning may reflect a development in feeding behaviour. It is possible that the ability to perform synchronous feeding behaviour becomes less important, and the ability to eat undisturbed by penmates more important during the first week after weaning. In addition, it is also possible that all pigs had learned to use the single-space feeder by the end of the first week and were therefore less reliant on the trough.

The lack of improvement in performance in the present study suggests that there is no overall benefit in providing newly-weaned pigs with additional wet feed in a trough. It is possible, however, that the trough may have benefited certain pigs in the group without affecting overall performance. Evidence from study 1 (increasing group size) suggests that small pigs may have difficulty gaining access to feeders in small groups, therefore these pigs may have benefited by the addition of the trough in the present study.

4.2 Effect of providing additional trough for groups of small pigs

The effects of weaning weight and of provision of wet feed in a trough in study B are given in Table 3. There were no significant interactions between weaning weight and providing additional wet feed on any of the parameters measured. Therefore providing wet feed in a highly accessible trough does not provide any additional advantage to groups of small pigs over groups of large pigs. However the average weaning weight of small pigs in the present study was 7.6 kg which may be greater than the average weaning weight of small pigs on commercial units. It is possible that providing wet feed may have greater benefits for pigs weaned at lighter weights whose digestive systems are less physiologically mature.

4.3 Management

Use of the troughs resulted in increased capital expenditure and increased labour with no overall improvement in performance. In addition, use of troughs reduced housing capacity. Each trough occupies 0.12 m² which is over half the space allowance of a stage 1 weaner (0.2 m²). The troughs also reduced the unobstructed area in the pen and care may be needed in the location of the troughs. If the trough is placed in the feeding area then it may block access to the feeders, and if it is in the dunging area then it may lead to increased dunging in the sleeping or feeding areas, or increased fouling of the trough.

5. CONCLUSIONS

- Increased labour and capital expenditure
- No improvement in performance
- No particular benefit for groups of small pigs

General summary for management of weaned pigs

	Increasing group size	Providing additional wet feed
Stage 1 growth	<i>no effect</i>	<i>no effect</i>
Stage 1 food conversion ratio	<i>no effect</i>	<i>poorer</i>
Stage 2 growth	<i>no effect</i>	<i>no effect</i>
Stage 2 food conversion ratio	<i>poorer</i>	<i>no effect</i>
Variability in groups	<i>reduced</i>	<i>no effect</i>
Capital expenditure	<i>reduced</i>	<i>increased</i>
Labour	<i>no effect</i>	<i>increased</i>
Production efficiency	Improved	Reduced

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