The post weaning and finishing performance of pigs with different wean weights when offered a high or low allowance of starter diets

E. Magowan[1], V.E. Beattie[2], M.E.E. McCann[1], A. Thompson[3], R. Bradford[4], K.J. McCracken[2], F. J. Gordon[3], M. Scott[2]
[1]Agri-Food and Biosciences Institute, Hillsborough, United Kingdom, [2]Devenish Nutrition Ltd, Belfast, United Kingdom, [3]John Thompson and Sons Ltd, Belfast, United Kingdom, [4]Preferred Capital Management, Belfast, United Kingdom
Email: elizabeth.magowan@afbini.gov.uk

Introduction Previous research comparing pig performance using different levels of starter diets has commonly examined the effect on the average weight of the group (e.g. Lawlor *et al*. 2002). In the few studies that have examined the effects of starter diets on pigs with different wean weights, the pigs were weaned at three weeks of age (e.g. Mahan *et al.* 1998). The main aim of this study was to investigate the effect of starter diet allowance on the post weaning performance of light, medium and heavy weight weaned pigs.

Materials and methods The experiment was designed as a 3 (light vs medium vs heavy weight pigs at weaning) x 2 (high vs low starter diet allowance) factorial design. Over six time replicates 720 LR x LW pigs were weaned at 4 weeks of age and penned in groups of 20. The average pen weight of light, medium, and heavy weight pigs was 7.1 (SEM 0.07), 9 (SEM 0.03) and 10.5kg (SEM 0.06) respectively. Pens of pigs were randomly allocated to either a 'High' or 'Low' starter diet allowance. Groups were balanced for sex and the weight of pigs was balanced between starter diet allowance. The 'Low' starter diet allowance regime offered pigs 2kg/pig of starter 1 diet followed by 4 kg/pig of starter 2 diet. The 'High' starter diet allowance regime offered pigs 4kg/pig of starter 1 diet followed by 8 kg/pig of starter 2 diet. Starter 1 and Starter 2 diets were commercial diets (Devenish Nutrition Ltd) with digestible energy content (DE) of 15.8 and 15.5MJ/kg respectively, total lysine 16 and 15 g/kg respectively and both had a crude protein (CP) content of 200 g/kg. In both regimes, pigs were offered grower diet (DE 14MJ/kg, total lysine 12 g/kg and CP 186 g/kg) *ad libitum* after they finished their allocation of starter 2. Pigs were transferred to finishing accommodation at 10 weeks of age and were offered the grower diet to 11 weeks of age followed by a finish diet until 20 weeks of age. Pigs were weighed and feed intakes were recorded at 7 and 10 weeks of age. Light and heavy weight pigs were also weighed at 15 and 20 weeks of age. The average daily gain (ADG), average daily feed intake (ADFI), feed conversion ratio (FCR) and feed intake per kg of body weight (FI/kg) was calculated between weaning and 10 weeks of age. Analysis of variance was used to test for the effects of treatment according to the 3 x 2 factorial design.

Results There were no significant interactions between the weight of pigs and starter diet allowance on pig weight or performance and the direct effects of starter diet allowance and weight of pig are presented in Table 1. The ADG and ADFI of medium and heavy pigs was similar but that of light weight pigs was significantly lower (Table 1). The FCR of light weight pigs was significantly ($P<0.001$) better than that of heavy weight pigs with that of medium weight pigs being intermediate. The FI/kg of body weight was highest ($P<0.001$) for light weight pigs and lowest for heavy weight pigs. Overall, pigs offered a high allowance of starter diets had a higher 10 week weight, ADG, lower ADFI and FI/kg bodyweight and an improved FCR compared with pigs offered a low allowance. However, the 10 week weight and ADG (between weaning and 10 weeks of age) of light and medium weight pigs was similar when they were offered either a low or high allowance of starter diets but that of heavy weight pigs was 1kg and 26g/day significantly higher when they were offered a high allowance of starter diets compared with a low allowance. The 15 and 20 week weight of heavy weight pigs was similar whether they were offered a high or low allowance of starter diets post weaning (56.3 and 57.8kg respectively). However, the 15 week weight of light weight pigs was significantly ($P<0.01$) greater when they were offered a high allowance of starter diets post weaning (52.4kg) compared with a low allowance (49.4kg). In addition, the 20 week weight of light weight pigs tended ($P=0.055$) to follow the same pattern with the weights of those which were offered a high allowance being 83.5kg and those offered a low allowance being 80.9kg.

Table 1 Pig performance between wean and 10 weeks of age

	Low allowance			High allowance			SEM	Effect of diet	Effect of weight
	Light	Medium	Heavy	Light	Medium	Heavy			
10 week weight (kg)	25.9	29.4	31.1	26.2	29.9	32.1	0.27	<0.01	<0.001
ADG (g/day)	459	499	504	468	509	530	6.2	<0.01	<0.001
ADFI (g/day)	684	743	753	657	730	743	8.4	<0.05	<0.001
FCR	1.52	1.54	1.57	1.42	1.45	1.47	0.011	<0.001	<0.001
FI/kg (g/kg)	42.1	39	36.6	40.1	37.9	35.3	0.33	<0.001	<0.001

Conclusions Higher allowances of starter diets improved the FCR of pigs in all weight categories. Heavy weight pigs had better growth when offered higher allowances of starter diets. There was a carry over effect into the finishing period for light pigs with higher allowances of starter diets improving their 15 and 20 week weight. Light weight pigs ate more per kg of their body weight in the post weaning period than medium and heavy weight pigs.

Acknowledgements This work was jointly funded by DARD, Devenish Nutrition Ltd and John Thompson and Sons Ltd

References

Lawlor, P.G., Lynch, P.B., Caffrey, P.J. and O'Doherty, J.V. 2002. Animal Science 75, 245–256
Mahan, D.C., Cromwell, G.L., Ewan, R.C., Hamilton, C.R. and Yen, J.T. 1998. Journal of Animal Science 76, 578–583