Factors affecting pig production efficiency

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Average growth rate of pigs on farms across the UK has been falling during the last five years.

In 2000 the growth rate for finishing pigs (25-95kg) was 657g/day, in 2005 it was 630g/day.

However, the genetic potential of pigs in this period averaged over 1000g/day. The purpose of this article is to look at one possible reason. Why the genetic potential of pigs is not being achieved?

Assessing variation

Some pigs nearly achieve their genetic potential in group systems on farm achieving approximately 900g/day from 25kg to slaughter.

However, other pigs in the same herd only achieve 550g/day over the same period. What is the effect of these slow growing pigs on average performance of the herd?

In a database of individual growth rates of pigs, from weaning to four weeks post-weaning, removing the bottom 20% of pigs increased the average growth rate by 25 from 341 to 366g/day, an increase of over 7%.

Variation between herds

The research partnership between the Agri Food and Bio Sciences Institute (Hillsborough), John Thompson & Son Ltd and Devenish Nutrition Ltd embarked on a three year project in which the performance of pigs in eight herds (all using the same diets) was monitored.

The herds selected varied in growth rate from 520-670g/day for the period weaning to 20 weeks of age.

The difference in growth rate between the top two and bottom two units equates to 35 extra days to reach 90kg liveweight.

Taking a standard food conversion ratio of 2.5 the extra five weeks equates to a total of 87.5kg of additional feed.

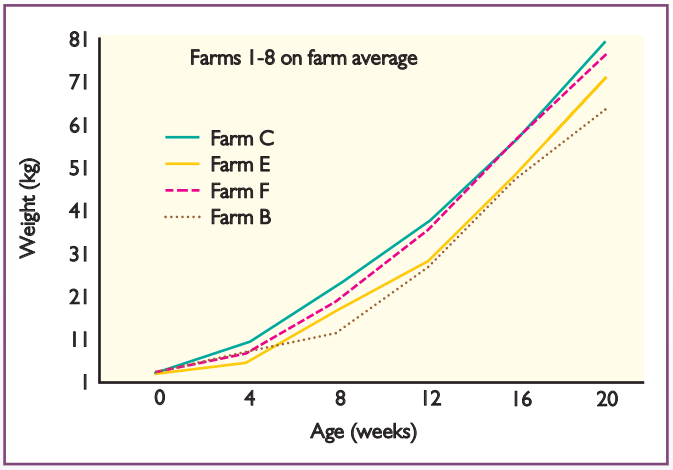

Fig. 1. Growth curves for pigs in top 25% vs bottom 25% of herds.

Where does variation begin?

The performance of pigs on the eight herds was assessed every four weeks.

Examination of each four week stage identifies where growth performance is good or poor on each farm (Table 1).

It would appear that early lifetime performance determines overall performance, for example, the top three herds in overall performance, C, F, A have the highest growth rates in stage one.

Fig. 1 shows the growth curves of the bottom 25% compared with the top 25% of herds. The curves are relatively parallel from 12-20 weeks of age. The main variation between the herds occurred prior to 12 weeks of age.

Variation in stage one

Comparing the top 25% of herds with the bottom 25% the first point is that the variation in the bottom herds is greater than in the top herds (Fig. 2).

In the top herds there is a 30kg difference in the weights of pigs at 20 weeks of age, while in the bottom herds the difference in weight at the same age is 50kg.

The second aspect is what begins as a small mean variation in weight (5kg) among pigs at the end of stage one (5-8 weeks of age) becomes greater than 17kg at 20 weeks of age.

The actual percentage variation remains the same at approximately 20%.

The pigs were selected at weaning to be within 0.3kg weight variation, hence the 20% difference between groups did not exist at weaning but was created in stage one and remained until slaughter.

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Fig. 2. Weight variation at 20 weeks in top and bottom 25% of herds.

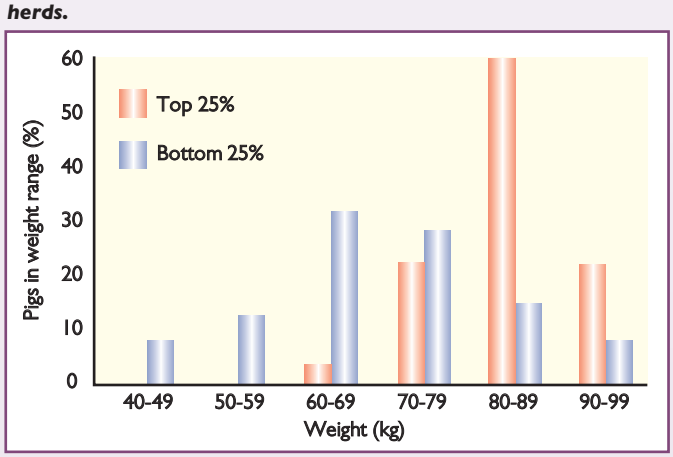
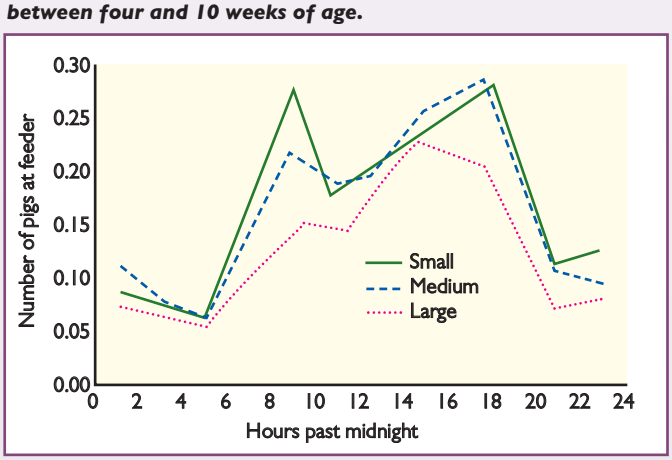


Fig. 3. Time spent feeding by small, medium and large pigs between four and 10 weeks of age.



	5-8 weeks		9-12 weeks		13-16 weeks		17-20 weeks		Overall
Herd	ADG (g)	Rank	ADG (g)	Rank	ADG (g)	Rank	ADG (g)	Rank	Rank
A	421	3	650	1	750	2.5	771	4	3
B	357	6.5	425	8	693	6.5	603	8	8
C	486	1	589	3	750	2.5	857	3	1
D	357	6.5	453	7	714	5	914	1	4
E	371	5	496	6	582	8	635	7	7
F	432	2	596	2	764	1	864	2	2
G	257	8	525	5	736	4	743	5	5
H	379	4	532	4	693	6.5	650	6	6

Table 1. Growth rates and rankings for different stages for eight herds.

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What causes variation?

One of the causes of variation within a herd may be as simple as large pigs require less time to feed compared to small and medium sized pigs (Fig. 3).

Therefore, small pigs suffer a double disadvantage in groups:

- They require more time at the feeder.
- They have to compete with larger pigs for feeder access.

Reducing variation

- **Feeder type.**

The type of feeder used in stage one and two influences the variation within the pen. Multi-space dry feeders are optimum in terms of minimum variation among pigs (Table 2). Seven weeks after weaning the 3kg spread in weights at weaning had increased to 7.5kg for the single space wet and dry and lean machine feeders, to 6.5kg for the Maximat and wet and dry multi-space feeders and to 5kg for the dry multi-space feeders.

Behaviour recordings show pigs spend less time at dry multi-space feeders compared to other feeders.

It appears that when feed and water are provided at the same source pigs can monopolise the feeder for long periods of time.

Pigs using dry multi-space feeders must leave the feeder to get water, thus, allowing smaller pigs to access the feeder hence reducing the variation.

- **Group size.**

Group sizes of 20 or greater reduces variation among pigs compared to group sizes of 10. The results from a group size study carried out at AFBI (Hillsborough) shows in groups of 10, small pigs are penalised both in stage one and stage two (324 and 632g/day respectively) compared with small pigs in larger groups (429 and 682g/day respectively). The restriction of small pigs in small groups is created by the large pigs being able to monopolise the single feeder.

In larger groups there are more feeders hence allowing small pigs access to less favoured feeders.

Summary

Variation costs the producer in terms of variable carcase, inefficient use of housing and increased feed costs for slower growing pigs. Variation starts in the weeks post-weaning, therefore, efforts should be concentrated in this period to ensure small pigs get the required nutrients through adequate feed intake. ■

This material was first presented at the SFTEurope Pigs November 2006 meeting.

Table 2. Differences in weight (kg) between heaviest and lightest pigs in groups of 20.

	Weeks post weaning				
Feeder type	1	2	3	5	7
Single space wet and dry	3.4	4.0	4.4	6.0	7.4
Lean machine	3.4	4.4	4.9	6.3	7.5
Maximat	3.2	3.9	4.4	5.5	6.4
Wet and dry multi-space	3.1	3.4	4.2	5.6	6.5
Dry multi-space	3.2	3.5	3.7	4.5	4.9