Reducing phosphorus (P) levels in gestating sow diets

Can we safely reduce the phosphorus (P) levels in gestating sow diets?

This project was sponsored by Defra and is a collaboration between Newcastle University and industry partners BQP (Dalehead Foods), BOCM Pauls Ltd and BPEX.

The aim of the project was to demonstrate that dietary phosphorus (P) levels in outdoor gestating sow diets can be reduced below the current commercial standards without negative effects on animal health and performance, while at the same time reducing diffuse phosphorus levels in the manure and effluent and consequently reducing the phosphorus load to the environment.

Benefits

- Reduced pollution of P to the environment
- Reduced need to add additional, costly P to the diet
- P is a finite resource and demand is starting to outstrip supply.

The trial

Two diets were formulated at a fixed Ca:P ratio with differing levels of digestible P, both including phytase. The diets were fed to gestating sows on four different farms over two reproductive cycles. All sows were housed outdoors and each diet was fed on a specific farm, thus giving two farms per diet.

The levels of digestible P in the different diets were:

- Diet 1 (current industry diet): 2.55g digestible P/kg feed
- Diet 2 (BSAS standard diet): 2.20g digestible P/kg feed.

The performance measures taken were:

- Number of piglets born (as well as stillbirths)
- Number of piglets weaned.

Soil and faecal samples were taken at three points across the trial - the start, midpoint and end. These samples were analysed for P levels to indicate the loading to the environment through excreta deposition.

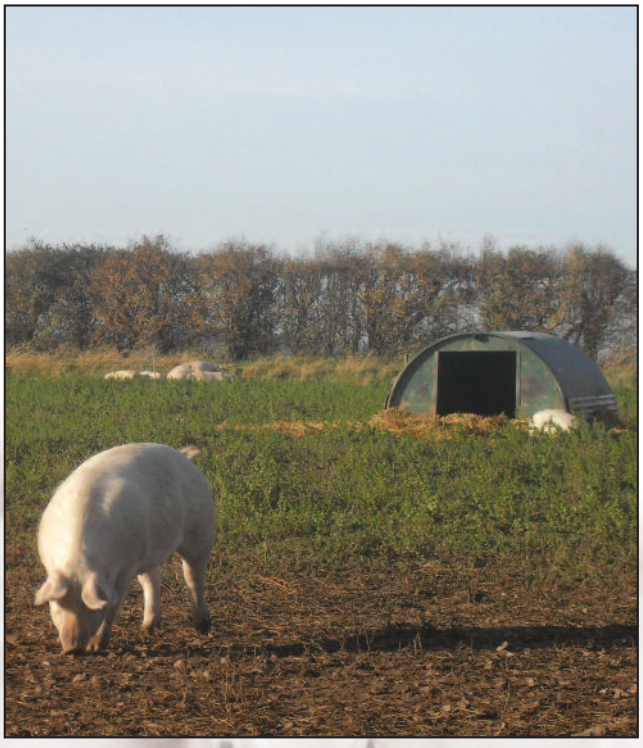
Results

Performance

- There was an effect of both diet ($P<0.001$) and farm ($P = 0.004$) on the numbers of piglets born alive, however, all these effects were largely caused by one of the farms having a smaller litter size compared to the other three
- Although there was an effect of parity ($P<0.001$) on the number of piglets born alive, there was no interaction between parity and diet ($P > 0.4$); ie the level of P in the diet did not affect sows of any parity
- There was no difference in the number of piglets born alive after either one or two cycles on a reduced P gestation diet ($P > 0.05$)
- The number of stillbirths was also not affected by diet ($P > 0.05$), nor was the farrowing interval.

Environment

Reducing the input of P through the diets was expected to affect the level of P output through excreta, thereby reducing environmental pollution. However, there was no indication of this in the analytical results on either the faecal or soil samples ($P > 0.05$).



Conclusion

There was a farm and diet effect shown, however, when taking into account the previous performance history of the farms involved it showed that this effect was present prior to the change in diet. This makes it reasonable to assume that the apparent effect of diet was in fact related to a farm effect. It can therefore be suggested that there were no adverse effects on the performance of the sows in the first or second trial farrowing cycle when fed on a lower level of P throughout gestation.

Furthermore, the absence of an interaction between parity and diet demonstrates that even younger sows are able to cope with lower levels of P in the diet without performance being affected under outdoor conditions. Since outdoor sows have access to minerals in the soil, results cannot be applied directly to indoor sows without further testing.

There was no difference detected in P load to the environment. The failure to detect an effect might be due to the sampling difficulties associated with variable feed intake of individual sows and the uneven patterns of excreta deposition across paddocks.

Figure 1 Average number of piglets born alive, weaned and stillborn per farm for the two diets differing in P content (Diet 1: current Industry diet; Diet 2: BSAS standard)

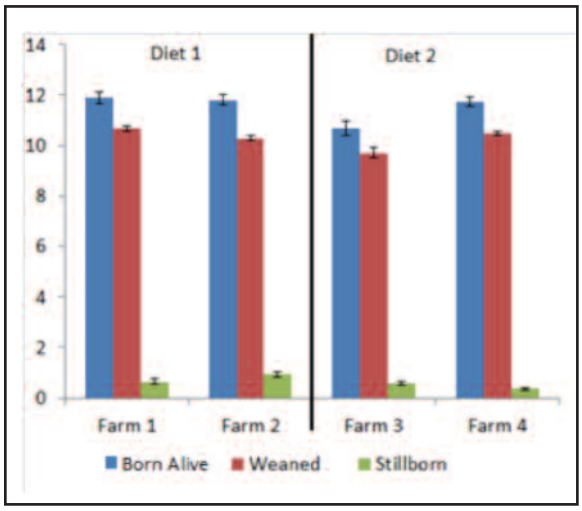
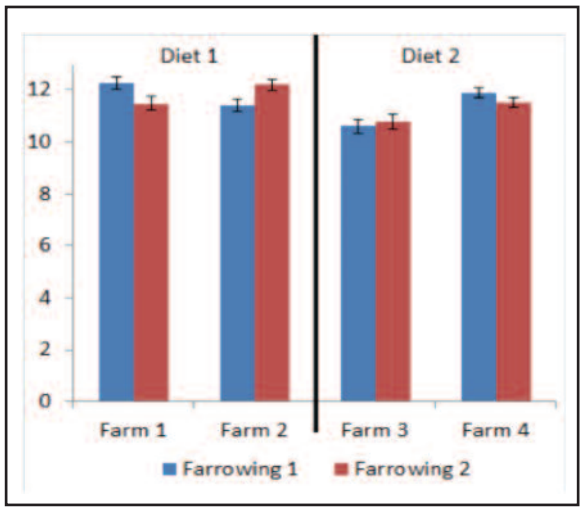


Figure 2 The number of piglets born alive in each reproductive cycle per farm on diets differing in P levels (Diet 1: current Industry diet; Diet 2: BSAS standard)



For more information and advice contact:

BPEX, Stoneleigh Park, Kenilworth, Warwickshire CV8 2TL
telephone: 0247 647 8792 • email: kt@bpex.ahdb.org.uk • website: www.bpex.org.uk