

significant difference was observed between groups (group 1: 263 days; group 2: 263 days; group 3: 255 days).

As compared with the other groups, the weight at puberty of gilts in group 1 was significantly lower and so was the ovulation rate (group 1: 10.4; group 2: 12.6; group 3: 12.6). This lowering of the ovulation rate affected the litter size at 30 days (group 1: 8.5; group 2: 9.3; group 3: 10.7), but not at farrowing (group 1: 8.5; group 2: 8.5; group 3: 8.5).

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## Use of horse-bean in pregnant gilt diets

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In the present experiment, 54 nulliparous Large White gilts were used to study the effects of a total substitution of soya-bean meal for whole horse-bean in the gestation diet on the survival and development of the embryos. The animals were distributed into three groups. Groups 1 and 2 received a diet containing 8 per cent soya-bean meal and 15 per cent "Ascott" horse-bean, respectively ensuring the same protein supply (12.3 per cent crude protein). The diet of the gilts of group 3 included 25 per cent horse-bean in order to measure the eventual effects of a higher supply of this feedstuff. Between mating at puberty (255 days of age, 117 kg) and slaughter at 105 days of pregnancy, the gilts received daily 2.2 kg of their respective diets.

The proportion of non-fertilized gilts was the same in the three groups (24 %). No difference appeared between the females with respect to weight gain (55 kg), ovulation rate (13.5), mean weight of corpora lutea (0.53 g) and total weight of ovaries (13.12 g). This was also the case for the number of normal (9.41) or abnormal foetuses (0.37) per litter and total embryonic mortality (29.8 per cent). However, the individual weight was lower for foetuses (923, 825 and 854 g, respectively in groups 1, 2 and 3) and placentas (212, 184 and 194 g) of the gilts fed with horsebean (groups 2 and 3). This suggests that the embryonic mortality might be increased in these animals in the case of a higher prolificacy, since the resulting greater competition among foetuses would more affect less vigorous individuals. However that may be, the horse-bean factors responsible for reduction in the weight of foetuses have not yet been determined.

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## Use of a potato protein concentrate in the diet of piglets weaned at 10 or at 21 days

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The nutritive value of a potato protein concentrate (CPDT = PPC: 83.5 per cent of N  $\times$  6.25 6.3 per cent lysine/dry matter) was estimated during two experiments each including 6 piglets weaned at 10 or at 21 days.

In the first experiment, the piglets primarily received 1st age diets containing 25 per cent crude protein out of which 50 per cent was skim-milk. The other fraction (50 per cent) was constituted of dissolved fish (CPSP = DFPC) in groups 1 (control) and 2; in groups 3 and 4, this fraction was composed of 25 per cent DFPC and 25 per cent PPC, finely ground or not, in group 5, 50 per

cent PPC. From the age of 28 days, these diets were progressively replaced by 2nd age diets containing 19 per cent crude protein: barley, soya-bean, herring meal in group 1 and barley, soya-bean, PPC in groups 2 to 5. The health of the animals was generally good, but was slightly lowered when non ground PPC was offered. The protein digestibility of the 1st age diet (group 5) was reduced by 3.2 per cent, but this was compensated for by a 4.5 per cent improvement of this parameter in the 2nd age diet, notably in comparison with group 2 which did not receive any PPC in the 1st age diet. The weight gain or feed conversion ratio were not significantly affected by the substitution of the proteins tested for fish proteins.

In the second experiment, the piglets received the same diet (21 per cent crude protein) throughout the period of investigation. The control group (A) was fed with a diet containing barley, maize, soya-bean, milk, herring; in the diet of the second group (B), PPC supplied 25 per cent of the protein in replacement of milk protein. In the third group (C), PPC provided 50 per cent of the total protein of the diet in replacement of milk + fish.

From the 3rd week of the trial, the feed intake of the experimental groups increased less rapidly than that of the control group (5.8 per cent less). However, the depressive effect on growth rate was only temporary and the performances measured between 3 and 9 weeks of age did not significantly differ (A = 404, B: 383, C: 394 g/d).

The results show that potato proteins might compete with the best fish proteins as a source of lysine in early weaned piglet diets.

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### **Pelleting of diets for early weaned piglets : nutritional consequences of pelleting procedures**

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Three methods for pelleting of early weaning diets (without moisture, with addition of 1.5 per cent water or of 2-2.4 bars of steam) were compared. The technological parameters: yield of the mill, hardness, durability of the pellets. The nutritive value of the diets was tested by estimating growth performances and digestibility in piglets weaned at 5 weeks. Addition of steam improved by 75 per cent the flow rate of the mill and increased the hardness of the pellets. Addition of water led only to a lowering of the mean temperature of the product at the outlet of the diet. Pelleting with addition of water and especially steam was accompanied by a decrease in the velocity of breakdown of the starch contained in the diet based on barley.

The performances of the animals were compared in two experiments carried out simultaneously, the one by couples (5 replications of 3 within-litter couples), the other by groups (5 replications of 6 piglets for each of the three treatments). The growth rate seemed to be lower in the animals receiving the "water" or "steam" pellets, especially in the experiments with the couples where the variability of the weight gain was the lowest. The most important results concern the significant increase in the feed conversion ratio according to the treatments (1.72 for "dry" pellets; 1.97 for "water" pellets and 1.85 for "steam" pellets). The apparent digestibility values of the organic matter confirm these trends and it seems that dry pelleting of early weaning diets corresponds both to the best animal performances and to the best valorization of the diet in spite of the technological difficulties.

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