

intakes were 14.2 (n = 10) or 10.4 (n = 10) Mcal per day, but daily supply of protein and amino acids was similar for all sows. Results were used to estimate maintenance requirements (MEM) and efficiency of ME utilization. During pregnancy, MEM averaged 100 kcal ME per kg metabolic weight ( $\text{kg}^{0.75}$ ) and the efficiency of ME utilization for energy deposition was 76.6 %. Efficiencies of ME utilization for deposition of energy in uterine and maternal tissues were 48 and 85 %, respectively. During lactation, MEM was 109 kcal ME per  $\text{kg}^{0.75}$  and efficiency of utilization of ME and of energy of body reserves (mainly fat) for milk synthesis were 72 and 85 to 88 %, respectively. ME given during pregnancy for body reserve storage was used for milk synthesis with a 67 to 71 % overall efficiency. These values are close to the efficiency of utilization of ME supplied during lactation for milk production (72 %). The interest of these results for prediction of energy requirements of sows by a factorial approach is discussed.

### **Weight gain partition in the pregnant sow : prediction by energy and protein intakes**

J.Y. DOURMAD

*INRA, Station de Recherches Porcines, Saint-Gilles, 35590 L'Hermitage (France)*

A simulation model was used to predict weight gain partition in the pregnant sow according to energy and protein intakes. It is based on recent information concerning energy metabolism in the pregnant sow and on a comprehensive analysis of the main factors affecting nitrogen retention.

The model was validated using numerous literature data concerning the influence of feeding on weight variation during pregnancy. It allows a good prediction of total and net pregnancy weight gain (R = 0.85 and 0.83, respectively) and gives the partition of that gain.

The different simulations emphasized the risk of establishing the feed requirements of the pregnant sow only on a weight gain basis without taking into account the effects on body composition. The development of this model also showed the lack of information about some of the factors affecting nitrogen deposition and about the effect of housing conditions.

### **Effects of feeding wheat, maize or barley-based diets during pregnancy on reproductive performance of sows**

M. ETIENNE

*INRA, Station de Recherches Porcines, Saint-Gilles, 35590 L'Hermitage*

An experiment was carried out in 96 Large White sows to study the effects of pregnancy diets based on cereals on reproductive performance. Females were distributed into 4 groups and fed the same diet during the first two pregnancies. In the control group, animals were fed a diet including 86 % barley and 10 % soybean meal. In the other groups, diets contained 96 % barley, wheat or maize without supplementary protein. Females ingested about 7 Mcal DE/day during pregnancy. The control diet was fed in restricted amounts during the three-week lactation period (5 kg/day during the first cycle and 5.2 kg/day during the second one).

Weight changes of sows were related to the pregnancy diet. Total and net pregnancy weight gains were higher in the control group (mean of the two cycles : 58.3 and 41.4 kg for total and net gain, respectively), lower in the maize group (39.4 and 25.1 kg) and intermediate in the barley (48 and 32.5 kg) and wheat groups (47.3 and 31.7 kg). Weight losses of the sows during lactation were all the more marked as weight gain was high during gestation (- 13.9, - 6.0, - 4.0, and - 7.1 kg in the control, barley, wheat and maize groups, respectively).

Sow prolificacy and piglet survival were not affected by the pregnancy diet. In contrast, the mean live weight of piglets was higher in the control group than in the other ones, especially at weaning (on an average for the two cycles : 5.5, 5.0, 4.7 and 4.8 kg in the control, barley, wheat and maize groups, respectively) and at 35 days of age (7.5, 6.3, 6.4 and 6.3 kg). Feeding diets containing 96 % cereals during pregnancy reduced the development of body reserves and affected milk production during lactation. These effects particularly marked with maize may be attributed to the lysine deficiency of cereals.

Estimation of changes in the sow body composition during pregnancy showed that the lower gain of sows fed the experimental diets were due to a lower muscle gain, especially in the maize group, whereas fat deposition was not affected. On the other hand, the pregnancy weight gain decrease between the 1st and the 2nd cycle whatever the diet (mean difference between the first and second pregnancy : 8 kg for total weight gain and 9 kg for net weight gain) was due to a lower fat deposition. It is explained by higher energy maintenance requirements of heavier animals. Therefore, energy requirements during pregnancy increase with parity number.

### **Utilization of spring peas by the sow during pregnancy and lactation**

F. GATEL, G. BURON, M. LEUILLET

*I.T.C.F., 8, avenue du Président-Wilson, 75116 Paris*

Utilization of spring peas (*Pisum sativum*) of the variety « Amino » was tested in 137 sows totalizing 536 litters distributed over 7 cycles. Control animals were fed diets without peas including cereals, soybean meal, bran and fish meal. They were compared to animals fed a diet including 16 % peas during pregnancy and 24 % during lactation (peas replacing cereals and soybean meal).

Diets including peas were well ingested. Net pregnancy weight gain was similar whatever the diet, whereas weight losses during lactation were 6 % higher in the pea-fed group. Weight change of sows was similar with the two dietary treatments. On an average, there was no difference in prolificacy between the two groups of animals. Birth weight and mortality of suckled piglets were similar in both groups. Growth rate of suckled piglets was slightly higher with pea-based diets (216 versus 210 g/day). Culling rate was similar in both groups. It was concluded that the incorporation of 16 and 24 % spring peas into gestation and lactation diets did not affect the reproductive performance or life of sows.

### **Effects of feeding gilts with normal or low glucosinolate rapeseed meal on reproductive performance**

M. ETIENNE, J.Y. DOURMAD

*INRA, Station de Recherches Porcines, Saint-Gilles, 35590 L'Hermitage*

Effects of feeding normal (cv. Jet Neuf) or low glucosinolate (cv. Tandem) winter rapeseed meal on reproductive performance were investigated in 107 Large White gilts. After mating, females were fed diets with 13.5 % soyabean meal (control group) or 20 % Jet Neuf (Jet Neuf group) or Tandem (Tandem group) rapeseed meal as sole protein concentrate. During a 3-week lactation, half the control gilts were fed the Jet Neuf diet and half the Jet Neuf and Tandem groups were fed the control diet. The other animals received the same diet as during pregnancy. Daily feed intake was 2.3 kg in pregnancy and 4 kg in lactation. All gilts were laparotomized 40 days post-mating to measure embryonic mortality. Eight gilts per group were slaughtered at 111 days of gestation. Thyroids of the dams and of their foetuses were weighed. Thyroid weight was also measured in three piglets per litter sacrificed at weaning.

Feeding diets containing 20 % normal rapeseed meal increased by 65 % the thyroid weight of gilts. This gland was not affected in the Tandem group. Thyroid hypertrophy was much more