127 The effects of an ideal protein lactation diet on sow and litter performance. M. D. Tokach*, R. D. Goodband, J. L. Nelssen, J. L. Laurin and J. A. Hansen. Kansas State University, Manhattan.

Four hundred lactating sows were used to determine the influence of an ideal protein lactation diet on sow productivity. Sows were fed either a 15.8% protein, corn-soybean meal, control diet (.8% lysine) or a 12.6% protein diet supplemented with synthetic amino acids to a 15.8% protein equivalent using the amino acid ratio suggested for the lactating sow by NRC (1988). Adaption of this ratio suggests the following amino acids as a percent of lysine: arginine, 67%; histidine, 42% isoleucine, 65%; leucine 80%; methionine and cystine, 60%; phenylalanine and tyrosine, 117%; threonine, 72%; tryptophan, 20%; and valine, 100%. The ideal protein diet was formulated by using corn and soybean meal to meet the isoleucine requirement of .52% (.8% lysine x 65% isoleucine) with synthetic amino acids added to achieve the desired dietary levels of lysine (.8%), valine (.8%), threonine (.56%), tryptophan (.16%) and methionine (.24%). Litters were standardized within 24 h after farrowing. Sows were weighed and ultrasonically scanned for backfat thickness at farrowing and at the completion of the 21 d lactation. Lactation diet (Control vs Ideal protein) had no influence on litter weaning wt (51.9 vs 52.0 kg), daily sow feed intake (5.7 vs 5 8 kg), pig survivability (92.3 vs 93.1%) or sow backfat loss (2.8 vs 3.0 mm) Sows fed the ideal protein diet had lower ($P < .001$) plasma urea N than sows fed the control diet (31.6 vs 23.8 mg/dl) indicating that fewer amino acids were deaminated when sows were fed the ideal protein diet. However, sows fed the ideal protein diet lost more ($P < .01$) weight than sows fed the control diet (8.4 vs 11.4 kg). These results indicate that an ideal protein diet based on synthetic amino acid additions can be effectively used during lactation without depressing sow milk production, as measured by litter weaning weight. However, the ideal protein diet did not improve sow productivity and resulted in increased sow weight loss.

Key Words: Sow, Amino Acids, Protein

128 The effect of dietary energy intake on the nitrogen retention of pregnant gilts. R.H.King* and W.G.Brown, Victorian Institute of Animal Science, Werribee,Australia

Thirty females pigs were used to investigate the effect of six levels of feed intake providing a range in digestible energy (DE) intake from 3.8 to 10.8 McalDE/day on the nitrogen retention (NR) of gilts during pregnancy. Gilts were, on average, 203 days of age at mating, and during pregnancy were offered a protein-adequate diet containing 3.49 McalDE/kg, 155g/kg crude protein and 10.7g/kg lysine. Nitrogen balance studies were conducted during early, mid-and late pregnancy with 5-day collection periods beginning on days 30, 58 and 93 of pregnancy at which the mean live weights of gilts were 120.7, 136.3 and 158.3 kg, respectively.

Energy Intake (McalDE/d)	3.8	5.2	6.6	8.0	9.4	10.8	SED
NR(g/d)							
at day 30	2.5	8.3	11.3	16.5	20.1	22.7	2.2
at day 58	0.6	6.3	12.4	16.8	19.1	20.7	1.8
at day 93	1.6	9.5	15.5	20.6	23.9	26.6	1.8

At each stage of pregnancy, NR increased in response to increasing levels of energy intake and the relationship was best described by a linear equation in early pregnancy and by quadratic equations during mid-and late pregnancy. Extrapolation of the quadratic relationships revealed zero N retention occurred at daily energy intakes of 3.2, 3.8 and 3.6 McalDE during early, mid-late pregnancy, respectively. As the relationship between NR and energy intake is linear over the range in dietary energy intakes normally encountered in commercial pig production, the dietary protein requirement of the pregnant gilt should be expressed on the basis of an optional protein: energy ratio if the criterion for performance is maximum protein deposition.

Key Words: Gilt, Nitrogen Retention, Pregnancy

129 Calcium and phosphorus balance of gilts and mature sows during gestation and lactation. M. A. Giesemann*, A. J. Lewis, and P. S. Miller. University of Nebraska, Lincoln.

The purpose was to determine the effects of age and reproductive state of sows on the absorption and retention of Ca and P. Five-day total collections of urine and feces were conducted with 29 gilts during one of three periods: wk 13 or 14 of their first gestation, d 14 to 18 of their first lactation, or wk 13 or 14 of their second gestation. Mature sows (n = 27) also were studied at the same points of their fifth and sixth reproductive cycles. The diet was corn and soybean meal and contained 14% CP, .79% Ca, and .64% P. All animals were fed 1.90 kg daily during gestation and had ad libitum access to feed during lactation. Milk yield was determined on d 21 of lactation. The following traits were measured: absorption = (intake - fecal loss); retention during gestation = (intake - fecal loss - urinary loss); retention during lactation = (intake - fecal loss - urinary loss - milk loss). Neither absorption nor retention of Ca or P differed between the two gestation periods for either gilts or mature sows ($P > .27$), but gestating gilts absorbed and retained more Ca and P than did gestating mature sows ($P < .05$). Both gilts and mature sows consumed and absorbed more Ca and P during lactation than during gestation ($P < .001$). Digestibility of Ca and P during lactation increased markedly in comparison to gestation ($P < .01$). Mature sows retained similar amounts of Ca during lactation and gestation, but gilts retained less Ca during lactation than during gestation ($P < .08$). During lactation mature sows consumed, absorbed, and retained more Ca and P than did gilts ($P < .09$). Calcium and P digestibilities were similar for gilts and mature sows during lactation ($P > 16$). Compared to mature sows, gilts have greater ability and(or) impetus to absorb and retain Ca and P during gestation. However, the ability of gilts to maintain Ca and P balance during lacation may be compromised by low feed intakes.

Key Words: Sow Feeding, Calcium, Phosphorus

130 Initial breeding weight and management system effects on body composition in F-1 sows over three parities. E.A. Newton* and D.C. Mahan, The Ohio State University, Columbus.

A study was conducted to evaluate sow body compositional changes associated with 3 breeding weights under 2 management systems over a 3 parity period. A total of 138 F-1 L X Y gilts were allotted in 2 replicates of a split plot, 3 X 2 factorial RCB experiment. Gilts were fed 1.8, 2.3 or 3.2 kg/d of a .73% Lys C-SBM diet from 4.5 to 8 mo of age to achieve breeding weights of 114, 136 or 155 kg. All gilts were fed similar quantities of feed during gestation and received ad libitum a .82% Lys C-SBM diet during lactation. Management systems consisted of 1) indoor gestation pens and farrowing crates or 2) outside concrete-floored gestation lots and indoor farrowing pens. Maternal body composition was evaluated at 100-d gestation and 21-d postpartum in 6 sows/treatment/parity using the deuterium oxide dilution procedure. In gestation and lactation, maternal water, protein and ash weight increased ($P < .01$) with increasing breeding weight and parity. In the 114 kg sow group, gestation fat content increased with advancing parity, while it decreased in 155 kg sows ($P < .06$). Gestation protein content increased across parity in all sow weight groups. Protein and ash content expressed as a percentage of total component weight decreased linearly with increasing breeding weight in gestation I, but were similar by gestation III ($P < .01$). With advancing parity, fat percentage decreased ($P < .01$), whereas percentage of water increased ($P < .01$). Fat and water percentages were not affected by breeding weight. Management system had no effect on maternal body composition in our study. These data suggest that initial breeding weight may affect stasis of body chemical components during the reproductive life cycle of F-1 L X Y sows.

KEY WORDS: Breeding Weight, Body Composition, Sows