

condition. The higher proportion of sows in the optimum backfat category demonstrates that feeding based on backfat and body weight has the potential for facilitating more precise gestation feeding.

Key Words: Sows, Feed Intake, Backfat

130 Effect of gestation feeding method on sow performance in lactation. M. G. Young^{*1}, M. D. Tokach¹, F. X. Aherne², R. G. Main¹, S. S. Dritz¹, R. D. Goodband¹, and J. L. Nelssen¹, ¹Kansas State University, Manhattan, ²Alberta Pig Company, Canada.

A total of 562 sows were used to examine the effect of 3 gestating feeding methods on lactation performance. Control gilts and sows were fed according to a standard 5-point visual body condition score (1 = thin, 5 = fat). Feed allowance was arbitrarily set by the farm manager to achieve a body condition score of 3 at farrowing. For method 2, feeding level was based on backfat and weight (at weaning for sows or service for gilts). Feed allowance was modeled from calculations of weight and backfat gain to achieve 19.0 mm backfat at farrowing with a constant feed allowance from d 0 to 101. Method 3 was similar to method 2, except feeding was altered for thin sows and gilts (< 15 mm backfat at service) in an attempt to reach a target of 19.0 mm backfat by d 36 of gestation. Sow weight and backfat was recorded at entry into the farrowing house (d 108 to 113 of gestation) and at weaning. Lactation feed intake, total number of pigs born, born alive, born dead, mummified, fostered, and weaned were recorded. Dates of weaning and estrus were recorded to calculate wean-to-estrus interval. Performance in lactation and wean-to-estrus interval were not affected ($P > 0.10$) by gestation feeding method. Sow weight at farrowing, weaning, and lactation weight loss were not different ($P > 0.20$) among the three feeding methods. Lactation ADFI was not affected by gestation feeding method. The relationship between weight gain in gestation and lactation feed intake was highly variable with weight gain only explaining 9% of the differences in lactation feed intake. However, when comparing lactation ADFI for the high backfat sows (> 23 mm) to the rest of the population (≤ 23 mm), a tendency ($P < 0.06$) was observed for high backfat sows to have lower ADFI in lactation (5.6 vs 5.9 kg). Total number of pigs born, born alive, born dead, mummified, and fostered pigs were not affected by gestation feeding method. The results indicate that the gestation feeding methods used in this trial had no effect on performance in lactation.

Key Words: Sows, Feeding Method, Lactation

131 Effect of dietary levels of soluble and insoluble fiber on litter size and sow performance. J. A. Renteria^{*1}, L. J. Johnston¹, S. K. Webel², and R. L. Moser², ¹University of Minnesota, St. Paul., ²United Feeds, Sheridan, IN.

Three concurrent experiments involving 716 sows were conducted to evaluate the effects of soluble (S) and insoluble (IS) dietary fiber during gestation on litter size and sow performance. Sows were assigned randomly to a common control diet or a high fiber diet within each experiment. In Exp. 1, diets included a corn-soybean meal control (C; 1.54% S, 7.97% IS; n = 122) or corn-soybean meal-30% oat bran high in S fiber (HS; 3.18% S, 8.03% IS; n = 124). In Exp. 2, diets included C (n = 97) or corn-soybean meal-13% wheat straw high in IS fiber (HIS; 1.41% S, 15.63% IS; n = 119), and in Exp. 3, sows received C (n = 123) or corn-soybean meal-21% soy hulls (HS+HIS; 2.99% S, 20.80% IS; n = 131). Experimental diets were offered to sows to supply similar daily amounts of ME (6172 kcal), protein (250 g), and lysine (12 g) beginning two d post-mating. All sows, regardless of treatment, had ad libitum access to a standard lactation diet. The HS diet compared with C supported more sow wt gain during gestation (26.7 vs 16.1 kg; $P < 0.01$), but had no effect ($P > 0.30$) on total litter size born (11.15 vs 11.37 pigs), litter weaning wt (48.39 vs 49.09 kg), or ADFI of lactating sows (5.26 vs 5.45 kg). The HIS diet compared with C had no effect ($P > 0.20$) on sow wt gain during gestation (16.9 vs 13.4 kg), total litter size born (11.44 vs 11.32 pigs), litter weaning wt (54.8 vs 55.2 kg), or ADFI of lactating sows (6.01 vs 6.02 kg). The HS+HIS diet compared with C supported less sow wt gain during gestation (18.5 vs 28.6 kg, $P < 0.01$), and greater ADFI of lactating sows (6.20 vs 5.66 kg, $P < 0.01$), but had no effect ($P > 0.30$) on total litter size born (11.94 vs 12.27 pigs) or litter weaning wt (51.8 vs 53.2 kg). Post-weaning interval to estrus averaged 6.4 d and was not affected ($P > 0.15$) by dietary treatments. In conclusion, gestation diets high in soluble and/or insoluble fiber can be

fed at recommended energy and nutrient intakes without compromising sow or litter performance.

Key Words: Sows, Fiber, Litter Size

132 Full-Fat canola seed as an energy substitute for vegetable oil in late gestation and lactation diets. B. S. Zimprich^{*1}, R. L. Harrold¹, T. E. Socha¹, and D. Landblom², ¹North Dakota State University, Fargo, ²Dickinson State University, Dickinson, ND.

A total of 143 litters from 94 mixed parity sows were used to evaluate litter performance, sow body condition change, days to estrus, milk composition, and litter weights, when sunflower oil (SA) or full-fat canola seed (CA) were added to the control (C) diet of corn-soybean meal. Sows were randomly assigned to diets at day 100 of gestation. Sows were weighed and measured for body condition change using realtime ultrasound on day 100 of gestation, farrowing, day 7 and weaning. Milk samples were taken from three randomly selected sows per treatment per farrowing. Milk samples were analyzed for solids, protein, and fat at d 0 and 14. Litter weights were taken on d 0, 1, 7, and at weaning. SA sows returned to estrus earlier than C sows (4.60 vs. 5.25; $P < 0.07$). Sows on SA and CA diets weaned heavier litters than C sows (55.14, 53.37 vs. 49.44 kg; $P < 0.02$). The C and SA sows consumed more feed from d 100 to 0 than CA sows (39.25, 39.94 vs. 37.33 kg; $P < 0.03$). From d 0 to 7 SA sows ate more than sows on C and CA treatments (36.65 vs. 33.46, 32.78 kg; $P < 0.05$). Sows on SA and CA diets consumed more feed than sows on diet C between d 7 and weaning (58.12, 59.51 vs. 51.77 kg; $P < 0.02$). Overall feed intake showed SA sows consumed more feed than C sows (135.3 vs. 124.5 kg; $P < 0.03$). Milk collections taken on d 0 showed no differences between treatments, however, sows on SA diet had a higher butterfat content than sows on diets C and CA at d 14 (9.06 vs. 7.55, 7.86; $P < 0.03$). Sows on the SA diet also had a higher milk solids content on d 14 than sows on diets C and CA (19.61 vs. 18.24, 18.56; $P < 0.02$). Differences in survival rate of nursing piglets among treatments were not observed (88.96, 92.55, and 90.14%). There are benefits of increasing the fat content of late gestation and lactation diets for increased litter performance, and a quicker return to estrus. However, the cost of fat sources must be considered in determining the potential for these inclusions.

Key Words: Full-Fat Canola, Sow Performance, Milk Composition

133 Threonine is more limiting than valine in diets of lactating sows with high body protein loss. K. T. Soltwedel, R. A. Easter, and J. E. Pettigrew, University of Illinois, Urbana.

The objective of this study was to determine whether threonine or valine is more limiting in corn-soybean meal diets fed to lactating sows mobilizing a high amount of body protein, using plasma urea nitrogen concentration (PUN) as an indicator of amino acid limitation. The study was conducted as a replicated 4 X 4 Latin Square with three squares. Initial sow BW averaged 241 kg and initial litter size averaged 9 pigs. A diet containing corn and soybean meal as the only protein sources formulated to 0.90% lysine was diluted with starch, sucrose and soybean oil to lower the protein concentration and induce a high rate of body protein loss. L-lysine-HCl and D,L-methionine were added at 0.112 and 0.016% of the diet, respectively, to ensure that lysine and methionine were not limiting. From this basal diet, each of the following dietary treatments was formulated: 1) the negative control (NC) basal diet, 2) the NC diet supplemented with 0.139% L-threonine (NC+T), 3) the NC diet supplemented with 0.174% L-valine (NC+V), 4) the NC diet supplemented with 0.139% L-threonine and 0.174% L-valine (NC+T+V). Dietary treatments were made isonitrogenous by glycine supplementation. The study was initiated on either d 3, 4, or 5 of lactation for each sow. Feed intake was standardized to 4.8 kg/d, an amount of feed that did not exceed sow appetite, yet provided sufficient energy intake (18 Mcal ME/d). Each diet was fed to each sow for a period of four days. At the end of each period, blood samples were collected 5 to 6 h post-prandial for analysis of PUN. The PUN was lower ($P < 0.01$) for the threonine-supplemented treatments, and was not affected ($P < 0.10$) by supplemental valine intake (see Table). Total sow BW loss and litter gain averaged 19.58 and 35.05 kg, respectively, for the entire 16-d study. This study demonstrates that threonine is more limiting than valine in corn-soybean meal diets fed to lactating sows with a high rate of body protein loss in lactation, when PUN is used as an indicator.