164 The effects of high oil corn and fat level on nursery pig growth performance. J. R. Bergstrom*, C. J. Samland, J. L. Nelssen, M. D. Tokach, and R. D. Goodband, *Kansas State University, Manhattan.*

Two studies were conducted to evaluate the effects of adding high oil corn (HOC) or other sources of fat to nursery diets. In Exp. 1, 185 pigs were weaned at 20 d of age, blocked by weight (initially 5.6 kg), and fed a common without added fat from d 0 to 3 postweaning. On d 3, pigs were allotted to one of five dietary treatments, with 6 or 7 pigs/pen and 6 pens/treatment. The control diet was a normal-corn (NC, 3.7% fat and .26% lysine) and soybean meal diet. In the second treatment, HOC (7.8% fat and .31% lysine) replaced the NC and some of the soybean meal to achieve an equal lysine level. Three additional treatments were obtained by adding either soybean oil (SO), choice white grease, or poultry fat to the control diet at the same fat level as the HOC treatment. Overall (d 0 to 34 postweaning), neither ADG or G/F were affected by either dietary fat or source. However, ADFI was reduced ($P < .05$) by feeding pigs poultry fat rather than the other dietary treatments. In Exp. 2, 180 pigs were weaned at 20 d of age (initially 6.0 kg) and fed the same common diet as in Exp. 1 from d 0 to 4 postweaning. On d 4, pigs were allotted to one of five dietary treatments, with 6 pigs/pen and 6 pens/treatment. The control diet, HOC diet, and SO diet were similar to those in Exp. 1, but maintained the same calorie:lysine ratio. A fourth treatment consisted of the HOC diet with the SO level of the SO diet. The fifth treatment was derived by adding a high level of SO to the control diet to make it isocaloric to the fourth treatment. Overall (d 0 to 35 postweaning), pigs fed SO had greater ($P < .05$) ADG than pigs fed the control or HOC diets. No differences were observed in ADFI. However, G/F tended to improve ($P < .07$) when pigs were fed either NC with SO or HOC with SO, with no differences between NC and HOC treatments. These results reflect the limited ability of the nursery pig to utilize dietary fat.

Key Words: Pigs, High Oil Corn, Fat Source

165 Carry-over responses to an intestinal hydrolysate in weanling pig diets. D. R. Zimmerman, J. C. Sparks*, and C. M. Cain, *Iowa State University, Ames.*

The objective of this research was to evaluate porcine intestinal hydrolysates (IT) as replacements for dried whey in weanling pig diets. In a series of three trials, pigs were weaned at 3 wk of age, fed experimental treatments for 2 wk and then fed common diets for an additional 2 wk in trial 1 and 2 and an additional 6 wk in trial 3. Control diets contained 25 or 26% dried whey. The IT partially replaced dried whey. Lactose and lysine concentrations were kept constant across treatments. In trial 1, the highest level of IT (12 26%) decreased daily feed intake (FI) and daily weight gain (WG) in week 1, whereas pigs fed 6.13% IT and 5% of a commercial IT (Protein Plus) did not respond differently than control pigs. In wk 3 and 4, when all pigs were fed a common diet, pigs previously fed IT treatments had greater FI and WG. In trial 2, pigs fed 5% spray-dried plasma had greater FI, WG, and G/F than other treatment groups in wk 1. In weeks 3 and 4, when all pigs were fed a common diet, there were trends for pigs that had previously been fed 6% of three IT sources (trt 2, 3, and 4) to have greater FI and WG. Treatment groups in trial 3 were: 1) control, 2) 6% IT for 2 wk, and 3) 6% IT for 4 wk. Performance of all groups were similar for the first 2 wk, but in wk 3 and 4, pigs fed IT or previously fed IT had greater FI and WG than control pigs. All pigs were then transferred to grower pens. The pigs that had previously received IT had greater FI and WG in wk 5 and 6, but not in wk 7 and 8. Positive FI and WG carry-over responses to IT occurred in three of three trials. There was a 2-wk lag time before responses were observed, followed by a 4-wk persistence of responses. This pattern suggests that the active component(s) causing the positive response may be acting to speed the maturation of the pigs ability to digest or assimilate nutrients.

Key Words: Weanling pigs, Intestinal hydrolysates, Carry-over growth

166 Evaluating the feeding duration of a phase 1 nursery diet to pigs of two weaning weights. D. C. Mahan*, G. L. Cromwell, R. C. Ewan, C. R. Hamilton, and J. T. Yen, *NCR-42 committee on swine nutrition*

A regional study (KY, IA, MARC, OH, SD) involving a total of 648 nursery pigs followed by 498 grower-finisher pigs evaluated the effects of feeding a phase 1 diet for varying lengths postweaning (1, 2, 3 wk) to 3-wk old weanling pigs of two different weaning weights (5.5 or 7.5 kg). After feeding the phase 1 diet, pigs were fed a phase 2 diet (total 5 wk for both phase 1 and 2), a grower (to 56 kg) and a finisher-diet to 105 kg BW. Station effects were significant ($P < .05$) but station x treatment responses were not ($P > .15$). Although heavier wt weanling pigs were about 1 d older at the start of the trial, they reached 105 kg BW approximately 8 d earlier. The heavier wt group gained faster ($P < .01$) and consumed more feed ($P < .01$) each week of the nursery period. Switching pigs to the phase 2 diet resulted in lower gains during the next week compared with pigs fed the phase 1 diet, but they also appeared to compensate during ensuing weeks. For the 5 wk nursery period, daily gains ($P < .06$) and gain:feed ratios were lower ($P < .01$) when the phase 1 diet had been fed for only 1 wk for both pig weight groups. There was no interaction response during the nursery period between weaning wt x length of feeding the phase 1 diet on daily gains or daily feed intakes. Grow-finish pig gains and feed intakes were both higher ($P < .01$) with the heavier wt weanling pigs when the phase 1 diet had been fed for 2 or 3 wk ($P < .05$), with an improved gain:feed ratio during the grower-finisher ($P < .01$) and the overall weaning-finisher period ($P < .05$). There was no evidence of compensatory growth for lighter wt weanling pigs during the grower or finisher periods. These results suggest that feeding the phase 1 diet for 2 wk to either weanling pig weight group reduced the total days to market by about 3 d, but weaning heavier wt pigs appeared to have the greater effect on postweaning performance and days to market.

Key Words: weaning, pigs

167 Defining the sources of variation in the energy content of barley. S. L. Fairbairn[1]*, J. F. Patience[1], and H. L. Classen[2], *[1]Prairie Swine Centre Inc., Saskatoon, Saskatchewan, Canada, [2]University of Saskatchewan, Saskatoon, Saskatchewan, Canada.*

Presently the industry attempts to formulate energy levels in swine rations to within a tolerance of 1.5%. Precise feed formulation is very difficult when the energy level in the primary feed ingredients fluctuates by 8-12%, as occurs for example in barley. This experiment was carried out to define the sources of variation in the energy content of barley, and to develop practical ways to accurately estimate the digestible energy (DE) content of individual barley samples. Growing barrows (35 kg ± 5 kg) were used to determine digestibility and metabolizability of 20 barley samples. Four samples of each of 5 hulled varieties (Harrington, Manley, B 1602, AC Lacombe and Bedford) were collected across 3 provinces (Saskatchewan, Alberta and Manitoba) to obtain representative samples of each variety. The sample diets, containing 96.4% barley, 3.2% minerals and vitamins, and 0.4% chromic oxide were offered twice daily at levels estimated to provide DE at 2.5 x maintenance. The pigs were housed individually in steel metabolism crates to allow separate collection of feces and urine during 5 day collection periods which followed 5 day acclimation periods. There were 5 observations per sample for each of the 20 barley samples. The DE levels in the 20 barley samples varied by 17.7% with a mean of 2,965 kcal/kg (90% DM). Variation within varieties was equal to or greater than that among varieties. Mean starch, total and insoluble β-glucan levels in the 20 barley samples were 53.76, 3.95 and 3.06% respectively. There were poor correlations between DE and starch, total β-glucan, insoluble β-glucan, soluble β-glucan or protein. This experiment clearly illustrates the large variation in energy content in barley and demonstrates the need to further characterize this variation. Further chemical assays are underway to develop prediction equations that estimate the DE content of barley within an acceptable tolerance for use by the industry.

Key Words: Barley, Variability, Digestible energy