age increased, ADG(226, 426, 486g, P<0.01) and ADFI(500, 599, 603g, P<0.01) and feed efficiency(2.21, 1.41, 1.24, P<0.01 for A, B, C respectively) were improved during the nursery period. Final body weights also increased (P<0.01) with increasing weaning age but there were no differences among body weights of treatment B and C. In the study of nutrient digestibility there were no significant differences. However, the digestibility of protein in treatment A tended to be lower than those of treatment B or C(82.7, 86.4, 86.3%, P=0.20 for A, B, C respectively). Also the nitrogen retention (g/day) of treatment A was lower than those of treatment B and C(1.78, 3.02, 3.58g/day, P < 0.05 for A, B, C respectively). To investigate the effect of different weaning ages on the integrity of the small intestine, a total of 48 weaning piglets were sacrificed at 0, 1, 2, and 7 days postweaning following treatments. The number of CD4+ T-cells tended to increase and then decrease after weaning, but there were no significant differences except for treatment C. The number of CD8+T-cells in treatment C was the lowest on weaning day when compared with other treatments(P < 0.01) but the values increased after weaning (P < 0.01). These results suggest, in a conventional and single-site production system, that the growth rate of early weaned pigs under 21 days of age is lower than that of older weaned piglets.

Key Words: weaning age, piglet, growth performance

157 Effects of weaning weight on growth performance, nutrient digestibility and integrity of small intestine in pigs weaned at 21 days of age. K. H. Cho*[1], H. K. Oh[2], W. S. Ju[2], J. H Yun[2], Y. D. Jang[2], and Y. Y. Kim[2], [1]*TS Corporation*, *Incheon, Korea*, [2]*Seoul National University*, *Seoul, Korea*.

This study was conducted to determine the effects of weaning weight on growth performance, nutrient digestibility and integrity of the small intestine in pigs. A total of 144 pigs were allocated into 4 treatments with 6 replicates, 6 pigs per pen, based on weaning weight and sex by a randomized complete block design. The treatments included weaning weights of 4.5(A), 5.5(B), 6.5(C) and 7.5(D) kg when weaned at 21 days of age. As weaning weight increased from 4.5 kg to 7.5kg, ADG (169, 174, 232, 213g, P<0.05) and ADFI(230, 250, 330 , 340g, P<0.01 for A, B, C, D, respectively) were increased but there was no statistical difference of feed efficiency during the 3 weeks after weaning. ADG(460, 487, 510, 616g, P<0.01) and ADFI(680, 790, 860, 900g, P < 0.01 for A, B, C, D, respectively) increased but feed efficiency did not change during the 3 to 7 weeks after weaning. Final body weights increased (20.91, 22.73, 25.65, 29.29 kg, P<0.01 for A, B, C, D, respectively) with increasing weaning weights from 4.5 kg to 7.5 kg. The digestibility of dry matter, protein, fat and ash did not differ significantly. The nitrogen retention and nitrogen digestibility in treatment D tended to be lower than those of other treatments. To investigate the effect of different weaning weights on integrity of the small intestine, a total of 48 weaning piglets were sacrificed following treatments at 0, 1, 2, and 7 days post-weaning. The villi height of the small intestine decreased and then increased after weaning but there was no consistant relationship between villi height change and weaning weight. Comparisons of the crypt depth between treatments showed no statistical differences. The number of CD4+ and CD8+ T-cells did not change after weaning except in treatment D. This study suggests that the growth rate of heavier weaning weight piglets is higher than those of lighter weaning weight piglets and that no growth compensation is seen in lighter weaning weight pigs up to 70 days of age.

Key Words: piglet, weaning weight, growth performance

158 Effects of a liquid (Neolac) and dry feed combination fed in varying durations on weanling pig performance. R. C. Sulabo*[1], C. N. Groesbeck[1], J. M. Benz[1], R. D. Goodband[1], M. D. Tokach[1], S. S. Dritz[1], J. M. DeRouchey[1], J. L. Nelssen[1], and D. McKilligan[2], [1]*Kansas State University*, *Manhattan*, [2]*TechMix Inc.*, *Stewart, MN*.

One hundred eighty pigs (5.2 kg and 18 d of age) were used in a 28-d growth assay to determine the effects of combining a liquid starter diet (Neolac) with dry feed for various durations on nursery pig performance. Pigs were blocked by initial weight and randomly allotted to the following experimental treatments: dry feed only (Control) or Neolac provided for a period of 3 and 7 d in combination with dry feed. There were 9 replications of the control and 3 d Neolac treatments and 18 replicates of the 7 d Neolac treatment. At the end of each allotted period, liquid feeders were removed and pigs were fed dry feed solely until the end of the study. Average daily gain of pigs fed the liquid-dry feed combination was greater (269 vs. 223 g; P<0.01) until d 7 post-weaning. Weight gains obtained during this period were not maintained until the end of the nursery period (d 28) regardless of the duration of liquid feeding. Dry matter intake increased (P<0.01) as a result of liquid feeding (269 vs. 152 g). Pigs provided liquid feed for 7 d also had a lower DM gain/feed (P<0.06) than the dry-fed controls in all periods (d 0 to 28 = 0.89 vs. 0.92). In the first week post-weaning, liquid feed intake contributed 72 to 95% of the total DMI but its contribution declined as the pigs aged. The contribution of dry feed to total DMI increased from 5% on d 2 to 28% on d 6. Total DMI of liquid-fed pigs decreased on d 4 and 8 after the liquid feed was removed, which resulted in a loss of the initial advantages in weight gain due to liquid feeding. In conclusion, feeding a liquid complete diet in varying durations in combination with dry feed had positive effects on growth rate immediately after weaning but did not have lasting gains to influence overall nursery performance. Further experiments are needed to determine whether the improvement in initial feed intake with liquid feeding will reduce starve outs and mortality.

Key Words: nursery pig, liquid feed, growth

159 The effects of supplementing litters with a 2-phase milk replacer strategy during lactation on piglet growth performance. J. R. Bergstrom*[1], J. K. Aldous[1], and R. Cabrera[2], [1]*Kerber Milling Company*, *Emmetsburg, IA*, [2]*Ralco Nutrition, Inc.*, *Marshall, MN*.

A total of 220 litters were used at a commercial sow farm to evaluate the effects of supplementing litters with a 2-phase milk replacer program on piglet growth performance. At placement into farrowing rooms, an equal number of first parity females were randomly assigned for litters to receive the control (non-supplemented) and