known about the response of pigs to varying DE content in starter diets. The objectives of this study were to evaluate the effects of site of weaning and dietary DE content on piglet performance to 56 d of age. A total of 216 newly-weaned pigs (17 ± 2 d of age; 5.3 ± 0.2 kg BW) were randomly assigned within 3 replicate groups to pens of 7 pigs each and to one of 6 treatments arranged as a 2 X 3 factorial: on-site or off-site nurseries and 3 dietary energy levels (3.35, 3.50 or 3.65 Mcal DE/kg). Penning, drinkers and feeders were identical at each site. Dietary DE content was increased by changing the ratio of low to high energy ingredients Air quality (NH_3, CO_2, temperature and relative humidity) was monitored weekly to ensure similar environments at both sites. All pigs initially received commercial starter diets. At 25 d of age, pigs were assigned to Phase III experimental diets (3.5 g dlys/Mcal DE). At 41 d of age, pigs were switched to Phase IV diets (3.1 g dlys/Mcal DE). Individual pig BW and feed disappearance were measured weekly. Compared to on-site pigs, off-site pigs were significantly heavier at 56 days of age (23.4 kg vs. 21.2 kg; P<0.05) and had a higher ADG (0.43 kg/d vs. 0.39 kg/d; P<0.01). Pigs on the low DE diet ate more feed (P<0.01) and grew faster (P<0.01) compared to the mid or high DE diets. These results indicate that weaning off-site results in faster piglet weight gain, even when the herd of origin is of high health status. Increasing the DE content of the diet did not result in an increase in performance in early-weaned pigs. The source of increased dietary DE content may have affected the observed response to dietary energy.

Days of	ADG (kg/d)				ADFI (kg/d)			
age	Low DE	Mid DE	High DE	P	Low DE	Mid DE	High DE	P
25-41	0.47	0.41	0.43	0.01	0.56	0.49	0.49	0.01
42-56	0.65	0.63	0.63	NS	0.81	0.76	0.73	0.05

Key Words: Segregated-early weaning, digestible energy, pig

224 Effects of dietary L-carnitine on growth performance of nursery pigs. D. E. Real*[1], M. U. Steidinger[1], J. L. Nelssen[1], M. D. Tokach[1], R. D. Goodband[1], S. S. Dritz[1], J. M. DeRouchey[1], J. C. Woodworth[1], and K. Q. Owen[2], [1]*Kansas State University, Manhattan,* [2]*Lonza Inc., Fair Lawn, NJ.*

A total of 626 early-weaned nursery pigs (initially 5.1 kg and 14 ± 4 days of age) were used in three trials to evaluate the effects of added dietary L-carnitine on nursery pig growth performance. Pigs were blocked by weight and randomly allotted to one of five dietary treatments. Trial 1 had 4 or 5 pigs per pen and 7 replicate pens per treatment, while trials 2 and 3 had 8 pigs per pen and 5 and 6 replicate pens per treatment, respectively. In all three trials, the treatments consisted of a control diet containing no added L-carnitine, or the control diet with 25, 50, 75, or 100 mg/kg of added L-carnitine. Phase I, II, and III were from d 0 to 14, d 14 to 24, and d 24 to 34, respectively, in trial 1, and d 0 to 10, d 10 to 24, and d 24 to 38, respectively, in trials 2 and 3. During phase I, pigs fed increasing levels of L-carnitine had similar growth performance (P>0.05). During phase II, increasing L-carnitine (0, 25, 50, 75, or 100 mg/kg) increased (linear P<0.04; quadratic, P<0.10) ADG (325, 354, 361, 366, and 359 g/d) and improved (linear P<0.01; quadratic P<0.01) gain/feed (0.584, 0.654, 0.678, 0.673, and 0.675). However, a treatment × trial interaction was observed for G/F (P<0.04). In trial 3, increasing L-carnitine did not improve G/F to the same magnitude as in trials 1 and 2. For phase III, increasing L-carnitine had no effect on growth performance. Overall, pigs fed increasing L-carnitine tended (linear, P<0.08) to have greater ADG (366, 383, 377, 395, and 385 g/d). Also, L-carnitine improved (linear, P<0.01) gain/feed (0.712, 0.741, 0.733, 0.738, and 0.750). Therefore, these results suggest 25 to 50 mg/kg of added L-carnitine improved ADG and G/F in nursery pigs during phase II.

Key Words: Pigs, Nursery, Carnitine

225 Effects of dietary L-carnitine on growth performance and apparent nutrient digestibility in weanling pigs. M.J. Rincker*[1], S.D. Carter[1], R.W. Fent[1], B.W. Senne[1], and K.Q. Owen[2], [1]*Oklahoma State University, Stillwater,* [2]*Lonza, Inc., Fairlawn, NJ.*

Two experiments were conducted to evaluate the effects of supplementing L-carnitine to the diets of weanling pigs on growth performance and apparent total tract digestibility. In Exp. 1, 128 weanling pigs (5.5 kg initial BW; 18 d) were randomly allotted based on BW, sex, and litter to four dietary treatments containing 0, 25, 50, or 100 ppm L-carnitine. Pigs were fed in three dietary phases (P1: d 0-10; P2: d 11-24; and P3: d 25-38 with 1.6, 1.4, and 1.2% Lys, respectively). Phase 1 and 2 diets were complex corn-soybean meal-dried whey based containing animal plasma, blood meal, and lactose, while diets for P3 were corn-soybean meal based. Pigs and feeders were weighed weekly for the determination of ADG, ADFI, and G:F. There were 6 pens/trt of 4-6 pigs/pen. ADG, ADFI, and G:F for the 38-d study were, respectively: 337, 347, 370, and 363 g; 503, 502, 516, and 523 g; and .669, .692, .717, and .693. Dietary L-carnitine increased ADG (linear, P<.09) and G:F (quadratic, P<.03) for d 0-38. However, this improvement in ADG and G:F associated with L-carnitine was greatest during Phase 2 (linear, P<.03). In Exp. 2, six sets of four littermate barrows (4.9 kg; 18 d) were randomly allocated to the four dietary treatments as in Exp. 1. Pigs were housed individually in metabolism chambers and a 5-d total but separate collection of urine and feces was performed during each phase (P1: d 4-9, P2: d 17-22, and P3: d 29-34). There were no treatment by period interactions; therefore, data were pooled across periods. Growth performance trends were similar to those observed in Exp. 1. Increasing L-carnitine resulted in a slight improvement (quadratic, P<.10) in energy and nitrogen digestibility with the greatest response observed in pigs fed 25 to 50 ppm L-carnitine. These results suggest that the addition of 50 ppm L-carnitine improved growth performance and, to a lesser degree, nutrient digestibility in weanling pigs.

Key Words: Carnitine, Weanling pigs, Digestibility

226 Influence of increasing dietary niacin on starter pig performance. D. E. Real*[1], J. L. Nelssen[1], M. D. Tokach[1], R. D. Goodband[1], S. S. Dritz[1], J. M. DeRouchey[1], B. W. James[1], M. J. Webster[1], and E. Alonso[2], [1]*Kansas State University, Manhattan,* [2]*Lonza, Inc., Fair Lawn, NJ.*

Two experiments were conducted using 415 pigs (initially 4.8 kg and 12 ± 2 days of age) to determine the influence of increasing dietary niacin on starter pig performance. Pigs were blocked by weight and randomly allotted to one of five dietary treatments. There were 5 pigs per pen with 7 replicate pens per treatment in Exp. 1, and 8 pigs per pen with 6 pens per treatment in Exp. 2. Diets were fed in four phases: SEW (d 0 to 4), Transition (d 4 to 8), Phase 2 (d 8 to 22) and Phase 3 (d 22 to 35). Lysine levels in each phase were 1.70, 1.60, 1.50, and 1.30%, respectively. Diets were formulated to meet or exceed the pigs' tryptophan requirement. In both experiments, pigs were fed the control diet with no added niacin or the control diet with 27.5, 55, 82.5, or 110 mg/kg of additional niacin. There were no experiment × treatment interactions (P>0.20). From d 0 to 8, increasing niacin improved (quadratic, P<0.05) ADG (127, 121, 143, 134, and 129 g/d) and ADFI (149, 148, 161, 162, and 150 g/d). From d 8 to 22, increasing niacin tended (linear, P<0.10) to improve gain/feed (0.697, 0.730, 0.717, 0.727, and 0.712). From d 22 to 35, increasing dietary niacin had no affect (P>0.10) on growth performance. Overall, pigs fed increasing niacin tended (quadratic, P<0.11) to have greater ADG (339, 340, 348, 341, and 341 g/d). In summary, adding niacin to the diet resulted in a quadratic increase in ADG and ADFI with the greatest response found with the addition of 55 mg/kg of niacin from d 0 to 8 after weaning. Therefore, these results suggest feeding 55 mg/kg added niacin to nursery pigs to improve growth performance during the initial period after weaning.

Key Words: Pig, Vitamin, Niacin

227 Variation in the ileal digestible amino acid content of soybean meal as affected by location of production. T.A.T.G. van Kempen*[1], I.B. Kim[1], A. Jansman[2], M.W.A. Verstegen[2], J.D. Hancock[3], D.J. Lee[3], V.M. Gabert[4], D.M. Albin[4], and D. Mahan[5], [1]*North Carolina State University,* [2]*Agricultural University Wageningen,* [3]*Kansas State University,* [4]*University of Illinois,* [5]*Ohio State University.*

To assess differences in soybean meal quality that are related to location of production, researchers in IL, KS, NC, NL (Netherlands), and OH each collected locally processed soybean meal samples. Samples were from the 1998 harvest season and taken at least 15 days apart after processing. These samples were assayed for ileal digestibility and compared to a common shared source of soybean meal and soy protein concentrate as controls. A low-protein (4.5% CP) casein diet was used for determining endogenous nitrogen and amino acid losses. Digestibility