results demonstrate that feeding sows organic trace minerals resulted in more pigs born with greater litter gains during lactation. No advantage was recognized by feeding higher dietary trace mineral levels of either source over a four parity period.

Key Words: Sow, Trace minerals, Lactation

205 Prewean piglet survivability: Sel-Plex® verses sodium selenite as selenium source in sow diets.

J. Lampe*[1], G. Gourley[1], J. Sparks[2], and T. Stumpf[3], [1]*Swine Graphics Enterprises,* [2]*NutraBlend,* [3]*Alltech.*

Effect of selenium (Se) source on litter performance was evaluated in a side-by-side comparison of Sel-Plex® (selenium enriched yeast, Alltech) with sodium selenite. Supplementation was given to supply 0.3 mg added Se/kg. All sows received sodium selenite until initiation of Se source treatments on day 80 of gestation. Groups of sows bred within a week were randomly assigned to treatment by parity. The trial encompassed 6 weeks of farrowings within a 3,400 sow farrow to wean facility. Litter data were analyzed from 380 sows per treatment. Females remained on their respective treatment through weaning. Gestation and lactation diets contained 12.5 and 18.3% CP, 0.6 and 1.1% Lys, 3236 and 3463 kcal/kg ME, respectively. All litters were equalized to same number of piglets within treatment on day of birth. Milk Se concentrations were determined from 3 sows per treatment per farrowing week; samples were collected during mid lactation. Milk Se concentrations were greater (P#88040.01) in Sel-Plex group than in sodium selenite group (0.111 ± .003 ppm vs 0.088 ± .003 ppm). Sows receiving Sel-Plex weaned more pigs (P#88040.01) and had a greater litter weaning weight (P#88040.01). Prewean mortality of Sel-Plex treatment was 9.76% compared to 11.30% for sodium selenite treatment. This study demonstrates that prewean piglet survivability can be enhanced when Sel-Plex replaces sodium selenite as a dietary selenium source.

	Sel-Plex	Sodium selenite	SE	P=
Parity	3.74	3.74	0.08	0.98
Born alive	10.65	10.44	0.12	0.37
Birth wt (kg)	1.50	1.54	0.01	0.07
Still born	0.81	0.87	0.04	0.46
Pigs weaned	9.61	9.26	0.05	0.001
Litter wean wt (kg)	53.15	51.07	0.44	0.01
Wean age (d)	16.5	17.1	0.07	0.001
Wean to service (d)	6.61	6.48	0.20	0.73

Key Words: Swine, Selenium, Prewean mortality

206 Postwean piglet survivability: Sel-Plex® verses sodium selenite as selenium source in sow and nursery phase diets.

J. Lampe[1], G. Gourley*[1], J. Sparks[2], and T. Stumpf[3], [1]*Swine Graphics Enterprises,* [2]*NutraBlend,* [3]*Alltech.*

Effect of selenium (Se) source on nursery performance was evaluated in a 2 X 2 factorial arrangement of treatment design. Main effects were Se source and production phase. Se source was Sel-Plex® (selenium enriched yeast, Alltech) compared to sodium selenite. Production phases were sow (Se source treatment initiated at d 80 of gestation and maintained through weaning) and nursery. Supplementation was given to supply 0.3 mg added Se/kg. One thousand pigs were weaned, 500 from sows fed Sel-Plex and 500 from sows fed sodium selenite as Se source. The weaned pigs were placed in a commercial nursery and penned in groups of 25 head (0.25 m^2/pig). There were 10 pens per treatment and treatments were blocked within the room. Pens of pigs and feeders were weighed at entry, d 7, 14, 21, 28 and 42 of the trial. Average weight of pigs at entry to the nursery was 5.31 ± 0.04 kg and was not different dependent on Se source of the sow (P#88050.39). Pigs were fed a 3-phase nutrition program during the 42 d nursery trial. No overall main effects (P#88050.17) were observed for end weight, ADG or ADFI; 21.91 ± 0.14 kg, 0.39 ± 0.01 kg and 0.46 ± 0.01kg, respectively. An influence of sow Se source was observed (P=0.10) with total pigs surviving nursery. Fewer dead and culls (no value pigs) were observed in the nursery when pigs were from Sel-Plex fed sows. Total mortality and culls in the nursery was 3.2% for those pigs weaned from sows receiving Sel-Plex compared to 5.4% for those pigs weaned from sows receiving sodium selenite treatment. This study suggests that in commercial production, piglet survivability in the nursery can be improved when Sel-Plex replaces sodium selenite as the dietary selenium source of the sow.

Sow:	Sel-Plex		Sodium selenite	
Nursery:	Sel-Plex	Sodium selenite	Sel-Plex	Sodium selenite
Pigs in	250	250	250	250
Pigs out	243	241	238	235
Deaths	0	1	3	3
Culls	7	8	9	12

Key Words: Swine, Selenium, Nursery mortality

207 Interactive effects of milk supplementation and parity on pre- and postweaning mortality and growth performance of piglets on a commercial farm.

B. W. Ratliff*[1], A. M. Gaines[1], G. L. Allee[1], and J. A. Coalson[2], [1]*University of Missouri-Columbia,* [2]*Merricks, Inc.*.

A total of 125 (Genetiporc) sows and 1325 piglets (PIC 327 × Genetiporc) were used on a commercial farm to evaluate the interactive effects of milk supplementation and parity on piglet growth performance and mortality pre- and postweaning. Sow and piglet diets were formulated to meet all minimal NRC requirements. Sows were grouped according to parity as follows: parity 1 = group 1, parities 2 and 3 = group 2, and all parities greater than 3 = group 3. Litters from sows within the same group were randomly allotted to either milk or no milk treatments. At 48 h post-parturition, milk supplementation was initiated and piglets were counted and weighed. All cross-fostering and litter processing occurred prior to 48 h. Mortalities, their weights, and date of occurrence were recorded daily for each litter. At d 14 to 18, each litter was weighed, counted, and weaned. At weaning piglets were transferred to an off-site nursery facility and allocated by previous treatment. Piglets were weighed and feed intake recorded on d 0, 7, 14 and at the end of the nursery period. The date of occurrence, respective treatment and weight of mortalities were recorded daily. Data indicated that milk supplementation increased (P<0.05) litter weaning weight from 52.5 to 55.0 kg. Postweaning there was no difference (P>0.05) in growth performance between milk and no milk; however, mortality was decreased (P<0.05) with milk supplementation (0.9% vs. 4.1%). Piglets reared by parity group three sows had superior (P < 0.05) growth performance than those of parity groups one and two. Overall, this experiment indicates that the use of milk supplementation during lactation improves piglet performance preweaning and decreases mortality postweaning.

Key Words: milk supplement, pigs, sows

208 Influence of WEANMOR+® fed to sows on urine pH, stillbirth rate and preweaning mortality.

J. D. DeRouchey*[1], M. D. Tokach[1], R. D. Goodband[1], J. L. Nelssen[1], S. S. Dritz[1], and B. Christopherson[2], [1]*Kansas State University,* [2]*Soda Feed Ingredients LLC.*

WEANMOR+® is a microencapsulated dry calcium chloride product. The Cl- ions have been hypothesized to improve the dietary cation/anion balance by counter-balancing the K+ ions in the diet, which would decrease blood and urine pH, and decrease stillbirth rates and preweaning mortality. A total of 239 sows (parities 1 to 10; PIC C-22) were randomly allotted to one of the two experimental treatments approximately 5 days prior to their expected farrowing date. Treatments were: 1) Control sows; and 2) Sows that received a single daily topdress of 25 g of WEANMOR+. Urine samples were collected on a subsample of 40 sows within 24 hours after sows completed farrowing for determination of urinary pH. Sows on WEANMOR+ were fed for an average of 5.7 days prior to farrowing. WEANMOR+ tended to lower (P < 0.06, 6.28 vs 6.75) urine pH, but did not influence total number of pigs born, mummies, fostered, died, or weaned (P < 0.35). However, there was a tendency for a parity group by stillborn interaction (P < 0.10) where feeding WEANMOR+ reduced the number of stillborn pigs in the parity 2 to 5 sows with numeric increase in stillborns when WEANMOR+ was fed to parity 6 and over sows (Table 1). In conclusion, topdressing the feed with WEANMOR+ from 5 days prior to farrowing until weaning did not influence sow productivity in this experiment. The interaction between parity group and treatment that indicated a potential benefit in parity 2 to 5 sows warrants further investigation.

Influence of WEANMOR+® on stillborn rate[a]

Item	Control	WEANMOR+®	SE
Number of Sows	18	22	
Parity 1	8	9	
Parity 2-5	72	78	
Parity 6+	38	33	
Number of stillborns			
Parity 1	0.57	0.61	0.50
Parity 2-5	1.37	0.91	0.18
Parity 6+	1.42	1.82	0.25

Parity P<0.01; Treatment P<0.98; Parity X Treatment P<0.10;

Key Words: Sows, Lactation, Electrolyte balance

209 Corn dried distillers grains with solubles in sow lactation diets.

G. M. Hill[1], J. E. Link[1], M. J. Rincker[1], K. D. Roberson[1], D. L. Kirkpatrick*[1], and M. L. Gibson[2], [1]*Michigan State University,* [2]*Dakota Gold Research Association.*

High concentrations of protein, lysine, fiber and P in corn dried distillers grains with solubles (DDGS) make it a good potential feedstuff for lactation diets. Previous reports indicated that P in DDGS was 85% available in grower pig diets and diets containing up to 15% DDGS did not decrease grow/finish pig feed consumption. Our objective was to determine if lactating sows could utilize dietary DDGS to maintain body weight and lactation performance while decreasing P excretion. Sows were assigned to treatment based on expected farrowing date and parity. Diets met or exceeded NRC and contained 1.2% lysine, 0.9% Ca and 0.84% P. Treatments were: (1) 15% DDGS supplying 17% of P, or (2) 5% beet pulp (BP) with P supplied by monocalcium phosphate. Sows were gradually adapted from a common gestation diet to their respective treatment lactation diets fed ad libitum post-farrowing. Each treatment included 9 primiparous and 21 (BP) or 22 (DDGS) multiparous sows. Litters were balanced with a minimum of 11 pigs by d 2 post-farrowing and sows and litters were weighed on d 2 and 18. Fecal grab samples were collected on d 7, 14 and 18 and analyzed for P concentration. Treatment did not influence lactation performance. Sows weaned 10.9 and 10.8 pigs with pig gain of 3.82 and 3.91 kg for BP and DDGS, respectively. Sows lost 6.18 (BP) and 8.04 kg (DDGS). Litter weight on d 18 was less within BP treatment for primiparous vs multiparous sows (P=0.008). There was no parity effect with the DDGS treatment. Fecal P concentration did not differ on d 7 or 18. However, on d 14 BP sows had greater fecal P concentration than DDGS sows (33.02 vs 28.13 mg/kg DM, P<0.02). Over the lactation period BP sows exhibited a quadratic increase (P=0.07) while DDGS sows exhibited a linear decrease (P=0.05) in fecal P concentration. Inclusion of 15% DDGS in a lactation diet will support sow performance while maintaining and perhaps reducing P excretion.

Key Words: Dried distillers grains, Sow lactation, Phosphorus

Odor and Nutrient Management

210 Impact of diet manipulation on nutrient excretion and air emissions - intensive studies.

B.T. Richert*, A.L. Sutton, A.P. Schinckel, J.S. Radcliffe, and A.J. Heber, *Purdue University.*

Control of nutrient excretion and air emissions has many factors including; diet, genetics, building design, manure storage system, and producer management. A series of experiments have been conducted looking at many of these factors. By modifying the diets, we are controlling the inputs and instituting source reductions. The two key nutrients that are currently regulated and most researched are N and P. Through the use of synthetic amino acids in diets, replacing intact protein sources, N intake is reduced 15 to 30%, with corresponding reductions in N excretion. Currently, these reductions are accomplished by supplementing amino acids, lysine, methionine, and threonine. From a research standpoint, the use of tryptophan, isoleucine and valine can be incorporated and push this N excretion reduction to as high as 40-45%. The key to maintaining pig growth performance and carcass characteristics with low N excretion diets is to maintain amino acid balances and net energy levels in the diets. The correct amino acid ratios are open for debate, while formulation method (total, apparent or true ileal digestible) is of less importance with U.S. corn-SBM based diets. All three amino acid formulation methods maintain similar ratios to lysine in the NRC (1998) for tryptophan (17-19%), methionine (26-28%), total sulfurs (56-59%), valine (67-69%), and isoluecine (54-56%), with more variable ratios for threonine (60-68%). Reducing excess N and the dietary intact proteins does decrease N and hydrogen sulfide emissions from the swine facility. Phosphorus reductions are best achieved by reducing excesses, balancing to the available P requirement, and utilizing the phytase enzyme. Excretion of P can be reduced by 20-35% using these techniques. Reductions of P can be as great as 50-60% with the use of developing technologies of low phytic acid grains in the swine diets. Diet can be the leading point source reduction for many nutrients and emissions in swine operations and requires great detail and attention to minimize the environmental impact of swine operations.

Key Words: Swine, Nutrition, Nutrient excretion

211 On-farm application of diet manipulation to reduce nutrient excretion.

G. Allee*, *University of Missouri-Columbia.*

Reducing the amount of nutrients (nitrogen and phosphorus) excreted from swine production systems is potentially the greatest challenge to the future of our swine industry. It is well established that dietary manipulation is one of the most effective tools to reduce the environmental impact of pork production. However, adoption and implementation of nutritional concepts to reduce environmental impact is often slow by many in the industry. The use of on-farm studies has been a very effective procedure to gain acceptance and implementation of dietary manipulation to reduce nutrient excretion. Two large scale studies involving approximately 30,000 pigs were conducted to evaluate aggressive amino acid supplementation during the entire growing and finishing phase (25 to 125 kg). The experimental diets were fed in a five or six phase feeding program. The control diets contained approximately 0.15% L-lysine·HCl, throughout the entire grow-finish period while the aggressive amino acid supplementation program included greater additions of L-lysine·HCl and supplementation with L-methionine and L-threonine. Pigs fed the aggressive amino acid supplementation program had similar growth performance and carcass value, and a reduced cost of production. In addition, nitrogen excretion was reduced by the aggressive use of synthetic amino acids. In another on-farm trial, the use of low phytate corn and phytase enzyme demonstrated that phosphorus excretion could be reduced 20 to 50% without influencing growth performance or carcass value. The use of on-farm studies with key industry leaders is a very effective method to gain adoption and implementation of dietary strategies to reduce nutrient excretion from swine production operations.

Key Words: Pigs, Nitrogen, Phosphorus

212 Using growth models to predict nutrient requirements and excretions.

A. Schinckel*, R. Hinson, A. Sutton, B. Richert, and S. Radcliffe, *Purdue University.*

The compositional growth and nutrient accretion of pigs can be predicted based on previous empty body chemical composition research data. Daily nutrient requirements can be predicted based upon digestibility of feedstuffs consumed and the efficiency in which the available nutrients are utilized. Genetic population-gender-farm specific essential amino acid requirements can be predicted by three methods: (1) the utilization of serial real-time predictions of empty body protein and fat-free lean mass, (2) the mean fat-free lean gain over the grow-finish period (NRC, 1998); and (3) conducting nutrition trials in which alternative essential amino acids are fed. Currently research is being conducted by several groups to model daily P accretion rates as related to measures of empty body lean or protein mass, bone mass and/or ash mass. Further research is needed to evaluate the accuracy of predicting P accretion rates of pigs as affected by gender, genetics and environmental conditions. For example, research has indicated that pigs of high health status and pigs fed ractopamine have increased rates of carcass muscle gain and increased ratios of carcass muscle lean gain to visceral organ or bone growth. The importance of bone breaking strength must also be taken into account. Bone breaking strength responds differently to