O226 **Effect of sampling method on the accuracy and precision of estimating the distribution of pig weights in a population.** C. Paulk [1,*], G. Highland [2], M. Tokach [1], J. Nelssen [1], S. Dritz [3], R. Goodband [1], J. DeRouchey [1], K. Haydon [4], *[1]Animal Science and Industry, [2]Statistics, [3]Diagnostic Medicne Pathobiology, Kansas State University, Manhattan, [4]Elanco Animal Health, Greenfield.*

Estimating pig BW variation can enhance a producer's ability to determine the optimal time to market pigs. Thus the objective of this study was to determine the effects of sample size and method for estimating the SD of BW for a barn of pigs. We evaluated weighing: 1) a completely random sample of 10 to 200 pigs from the barn, 2) an increased number of pigs per pen from 1 to 15 pigs and increased number of pens until all pens in the barn had been sampled, and 3) select the heaviest and lightest pig (visually) in 15 pens, and subtract the lightest weight from the heaviest weight and divide by 6. Computer generated random samples (10,000) were used to calculate to calculate each sample SD using R (R Foundation for Statistical Computing, Vienna, Austria). The different sampling procedures were evaluated using 3 data sets where all pigs had been individually weighed. Dataset A consisted of 1,260 pigs in 48 pens (mean=114.8 median=115.2, and SD=14.9 kg). Dataset B consisted of 1,261 pigs in 19 pens (mean=96.9, median=97.1, and SD=9.8 kg). Dataset C consisted of 1,069 pigs in 40 pens (mean=100.8, median=101.6, and SD=14.5 kg). Increasing the number of random pigs sampled or number of pens sampled decreased the 95% confidence interval about the SD (CI; Table 1) with diminishing improvement as sample size increased. For a defined sample size (ex. 30 pigs), CI was reduced as the number of pens sampled was increased for all data sets but the reduction was modest. The CI was further reduced using sampling method 3. In conclusion, taking the difference between the heaviest and lightest of the 30 selected pigs (Method 3), and dividing by 6 resulted in a lower CI than any of the pig by pen combinations of sampling 30 pigs.

Table 1. Effect of sampling on range between the upper and lower 95% CI of SD

Method 1				Method 2				
Pigs	A	B	C	Pigs	Pens	A	B	C
10	14.6	9.4	14.5	15	2	9.0	5.9	11.4
30	8.5	5.3	8.3	10	3	8.9	5.9	10.7
50	6.4	4.0	6.3	6	5	8.8	5.6	9.7
70	5.4	3.4	5.2	5	6	8.6	5.6	9.5
90	4.7	3.0	4.7	3	10	8.5	5.3	8.7
110	4.2	2.7	4.1	2	15	8.6	5.2	8.4
130	3.9	2.4	3.8	1	30	8.4	N/A	7.9
				Method 3	15	5.4	2.0	7.6

Key Words: finishing pig, sample size, standard deviation estimation

NONRUMINANT NUTRITION: MINERALS

O227 **The site of absorption of calcium from the intestinal tract of growing pigs.** J. C. González-Vega [1,*], C. L. Walk [2], H. H. Stein [1], *[1]Animal Sciences, University of Illinois, Urbana-Champaign, [2]AB Vista feed ingredients, Marlborough, United Kingdom.*

An experiment was conducted to determine the standardized duodenal digestibility (SDD), standardized ileal digestibility (SID), and standardized total tract digestibility (STTD) of Ca in calcium carbonate and Vistacal at 2 different levels of Ca, and to determine if phytic acid affects digestibility of Ca in these 2 ingredients. An additional objective was to determine the basal endogenous loss of Ca in the stomach, small intestine, and large intestine. Nine pigs (initial BW: 23.8 ± 1.3 kg) were cannulated in the duodenum and in the distal ileum and allotted to a 9 × 6 Youden square design with 9 diets and 6 periods. Diets contained calcium carbonate or Vistacal as the sole source of Ca, 0 or 1% phytic acid, and 0.4 or 0.8% Ca. A Ca-free diet was also formulated and used to measure the basal endogenous loss of Ca. Fecal, ileal, and duodenal samples were collected on d 5 and 6, d 7 and 8, and d 9 and 10, respectively. The basal duodenal endogenous loss of Ca (1.03 g/kg of DMI) was greater ($P < 0.05$) than the ileal (0.42 g/kg of DMI) and total tract basal endogenous loss (0.67 g/kg of DMI). The SDD, SID, and STTD of Ca were not affected by the level of phytic acid in the diet. Increasing the level of Ca from 0.4 to 0.8% reduced ($P < 0.05$) the SDD, SID, and STTD of Ca if Vistacal was the source of Ca, but that was not the case if calcium carbonate was used (Ca level × Ca source, $P < 0.05$). The SID and STTD of Ca was greater ($P < 0.05$) than the SDD of Ca when Vistacal was fed, but no differences between the SDD, SID, or STTD of Ca in calcium carbonate were observed (Ca source × site of absorption, $P < 0.05$). In conclusion, the basal duodenal endogenous loss of Ca is greater than the basal ileal and total tract endogenous loss. Standardized digestibility of Ca is not affected by level of phytic acid, but is affected by dietary Ca level if Vistacal is the source of Ca, but not if calcium carbonate is used. Calcium from calcium carbonate is mostly absorbed before the duodenum, but Ca from Vistacal is mostly absorbed in the jejunum and ileum.

Key Words: calcium, pigs, standardized digestibility

O228 **Standardized total tract digestibility of phosphorus in *Brassica napus* black and *Brassica juncea* yellow in growing pigs.** P. Adhikari[*], J. M. Heo, M. Nyachoti, *Animal Science, University of Manitoba, Winnipeg, Canada.*

Eighteen growing barrows (initial BW, 19.9 ± 0.22 kg) were used to determine the apparent (ATTD) and standardized (STTD) total tract digestibility of phosphorus (P) in canola meals from *Brassica napus* black (BNB) and *Brassica juncea* yellow (BJY). The experiment was conducted in two consecutive blocks each with 9 pigs that were individually housed in metabolism crates that allowed for total but separate collection of feces and urine. Each block lasted for 14 d that allowed pigs to adapt their respective diets and environmental conditions for 9 d and followed by total collection of feces and urine for 5 d. Pigs were allotted to one of the three experimental diets, with factors being cornstarch-based diets containing either (1) BNB (320 g/kg), (2) BJY (308 g/kg) as the sole source of P or (3) a cornstarch-gelatin based P-free diet in a completely randomized block design to give 6 replicates per treatments. The P-free diet was used to measure endogenous P losses to determine STTD of P in pigs and was formulated to contain 180 g/kg CP. The pigs were fed their respective diets in two equal portions at 0830 and 1630 h. Daily feed allowance was based on the BW at the beginning of each block and was calculated to supply 2.6 times the estimated maintenance energy requirements. Titanium dioxide (3 g/kg) was included in the diets as an indigestible marker. The ATTD of DM (74.0 vs. 79.0%), P (29.0 vs. 28.0%), and Ca (48.0 vs. 52.0%) were not different ($P > 0.10$) either in pigs fed diets containing BNB or BJY, respectively. The endogenous losses of P estimation were 209 ± 96 mg/kg DMI (mean ± SD). The STTD of P for BNB and BJY was, therefore, calculated