499 Estimation of ideal body weight in horses and ponies using morphometric measurements. K. Martinson*[1], R. Coleman[2], J. Earing[1], A. Rendahl[1], and M. McCue[1], [1]*University of Minnesota, St. Paul,* [2]*University of Kentucky, Lexington.*

As the incidence of equine metabolic syndrome and obesity become more prevalent in the equine population, owners, veterinarians, and professionals need information to more effectively manage equine body weight. Body condition score (BCS) is used to measure body fat or adiposity in specific areas of the body, however, ideal body weight for equines is currently unknown. The objective of this study was to determine if ideal equine body weight could be derived based on body measurements unaffected by adiposity. Six hundred and 40 non-pregnant adult equines, ≥ 3 years of age, and ≥ 112 cm in height were measured and weighed at 2 non-breed specific equine shows in September 2011 in MN. For all equines, 2 personnel assessed BCS on a scale of 1 (poor) to 9 (extremely fat), one person measured wither height at the third thoracic vertebra, and 2 personnel measured body length from the point of buttock to the point of the shoulder. Girth and neck circumference, age, sex, and breed were also recorded, and equines were weighed on a portable livestock scale. Equines had a BSC range of 2 to 8 (mean = 5.6), mean age of 12 years, and the dominant breed and sex were Quarter Horses (n = 345) and geldings (n = 345), respectively. Of the 640 equines, 253 and 236 were given a BSC of 5 and 6, respectively, and were used to predict ideal weight. A linear regression for ideal weight was fit using body length and height as predictors. Neck ($P < 0.001$) and girth ($P < 0.001$) circumference affected model fit, however, these measurements are biased by adiposity and were removed from the model. Age ($P = 0.734$) and sex ($P = 0.337$) did not affect model fit. Body length ($P < 0.001$) and wither height ($P < 0.001$) accurately predicted ideal body weight ($R^2 = 0.86$). Breed ($P < 0.001$) affected the model, however, including that factor resulted in a minimum improvement in model fit ($R^2 = 0.88$). Morphometric measurements can be used to predict ideal equine body weight resulting in useful information for health and nutritional management of equines.

Key Words: body condition score, body length, height

500 Influence of maternal plane of nutrition and arginine supplementation on mares and their foals: Glucose and insulin dynamics. A. E. Hanson*[1], K. N. Winsco[1], J. A. Coverdale[1], C. J. Hammer[2], and A. N. Wolford[1], [1]*Texas A&M University, College Station,* [2]*North Dakota State University, Fargo.*

The objective was to determine if supplemental dietary arginine can mitigate the effect of maternal over-nutrition on mare and foal glucose and insulin dynamics. Thirty-two mares (468 to 668 kg BW; 3 to 19 yr) were blocked by expected foaling date and randomly assigned to treatments. Treatments were arranged as a 2 × 2 factorial with 2 planes of nutrition, moderate (Mod; 0.5% BW AF grain/d) or high (High; 1% BW AF grain/d) and 2 levels of L-arginine supplementation, 0.21 g/kg/d (Arg) or no supplemental Arg (Con; L-alanine to maintain isonitrogenous diets). Treatments began 110 d before expected foaling and terminated at parturition. Mares were housed by block, allowed ad libitum access to water and coastal bermudagrass (*Cynodon dactylon*) hay, and fed commercial grain 2 × /d in individual stalls. A modified frequent sampling i.v. glucose tolerance test (FSIGT) was performed on mares at 11 mo gestation and foals at 5 and 30 d of age. After a baseline plasma sample, a glucose bolus of 0.3 g/kg BW was administered, and then, an insulin bolus of 30 mU/kg BW after 20 min. Blood samples were harvested at 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 14, 16, 19, 22, 23, 24, 25, 27, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 150, and 180 min. Glucose concentrations were analyzed using a colorimetric assay and insulin using a RIA kit. Data were analyzed using PROC MIXED of SAS with effects of plane of nutrition (Nutr), amino acid (AA), time, and their interactions. There was no influence of diet on mare glucose area under the curve (AUC) or peak glucose (PG) and peak insulin (PI) concentrations. Mare insulin AUC tended to be influenced by diet ($P \leq 0.06$) with HighCon mares having greater AUC than ModCon ($P \leq 0.05$), and HighCon having greater AUC than HighArg ($P \leq 0.05$). Foal glucose AUC, PG, insulin AUC, and PI were not influenced by maternal diet. Mare AA tended to influence foal PG with foals from Con having higher concentrations than Arg ($P \leq 0.09$). Foal age influenced glucose and insulin AUC with glucose greater at 5 d compared with 30 d ($P \leq 0.003$), and insulin tending to be greater at 30 d than 5 d ($P \leq 0.08$). Data suggest maternal nutrition and arginine supplementation can alter mare and foal glucose and insulin dynamics.

Key Words: glucose, insulin, arginine

501 Prevalence of internal parasites and anthelmintic efficacy in horses in relation to age, season and housing system. E. R. Share,* J. M. Reddish, C. Dyer, K. Koke, K. Barnhart, P. Sparks, and K. Cole, *The Ohio State University, Columbus.*

The effective control of internal parasites is important in maintaining horse health. The objective of this study was to determine the prevalence of internal parasites and anthelmintic efficacy in horses in relation to age, season and housing system. Fecal samples were collected from 65 horses, ranging in age from 1 to 22 years, on a farm in central Ohio between July 2011 and January 2012. Fecal egg count data were collected before treatment with pyrantel pamoate at the recommended dosage and 14 d post-treatment. Fecal samples were analyzed by the fecal float method, with the number of internal parasites recorded as eggs per gram (EPG) of feces. Fecal egg count (FEC) reduction was calculated as (pre-treatment EPG minus post-treatment EPG)/pre-treatment EPG. Data were analyzed using the PROC GLM procedure of SAS. A P value of ≤0.05 was considered statistically significant. Treatment with pyrantel pamoate was considered effective if FEC reduction was ≥90% by d 14 post-treatment. Strongyle, ascarid, hookworm, pinworm, whipworm and tapeworm eggs were identified in this study; however, strongyle, ascarid and tapeworm eggs were the most prevalent. Young horses (<3 yr) had greater FEC compared with mature horses (464.35 ± 239 EPG vs. 198.89 ± 234 EPG, $P < 0.05$). FEC were similar during summer months compared with winter months. Horses maintained on pastures had greater FEC than horses kept in stalls (280.4 ± 261 EPG vs. 72.6 ± 100 EPG; $P < 0.05$). Resistance to pyrantel pamoate was evident regardless of the age of the horses, season or housing system. In this study, treatment with pyrantel pamoate was more effective at reducing total FEC in mature horses (27.8%) compared with young horses (14.3%). Pyrantel pamoate was also found to be more effective at reducing total FEC in the summer months (15%) as compared with the winter months (0%). Horses maintained on pastures were less resistant (21.4%) to treatment with pyrantel pamoate compared with stalled horses (16.7%). Although pyrantel pamoate was not considered effective in reducing the total FEC of horses on this farm, it may still be a useful product if used in combination other anthelmintics.

Key Words: horse, internal parasites, pyrantel pamoate

502 Antibiotic therapy disrupts equine fecal microflora. B. E. Davis*[1], L. M. Lawrence[1], M. D. Flythe[2,1], S. H. Hayes[1], G. L. Gellin[2], L. A. Strasinger[1], M. Brummer[1], and A. L. Fowler[1], *[1]University of Kentucky, Lexington, [2]United States Department of Agriculture, Agricultural Research Service, Forage-Animal Production Research Unit, Lexington, KY.*

Antibiotic associated diarrhea (AAD) is a side effect of antibiotic therapy in horses. AAD is attributed to the disruption of the normal microflora of the hindgut allowing colonization of pathogenic bacteria. However, there is little information on the effect of antibiotics on specific microflora. Therefore, we evaluated the effects of 2 common antibiotics on the equine hindgut microflora. Horses ranging from 2 to 14 y, were blocked by age and sex into 6 blocks of 3 horses. Within block, horses were randomly assigned to 1 of 3 treatments: CO (no antibiotic; n = 6), ST (trimethoprim-sulfadiazine, oral, 30 mg/kg; n = 6) and CF (ceftiofur sodium, IM, 2.2 mg/kg; n = 6). Each block consisted of a 21-d adaptation, a 7-d treatment and a 7-d withdrawal period. Fecal samples were collected during each block and were used to enumerate typical AAD pathogens (*Clostridium difficile*, *Clostridium perfringens* and *Salmonella* spp.) and selected normal microflora (lactobacilli and cellulolytics). Data were log-transformed, averaged within period, and analyzed by repeated measures ANOVA using the mixed procedure and the ttest procedure of SAS version 9.2. There were treatment x period interactions for cellulolytics ($P < 0.0001$) and lactobacilli ($P = 0.0504$) in that they decreased in response to CF and ST. No significant effects of period were found in the CO horses ($P > 0.05$). *C. difficile* was not detected during adaptation or in any CO horse throughout the study. However, there was a treatment by period interaction ($P < 0.0001$) where horses treated with antibiotics had an increase in *C. difficile* during the treatment and withdrawal periods. Antibiotics also increased *Salmonella* spp. prevalence ($P = 0.0024$). When comparing horses with and without detectable levels of *C. difficile*, horses with *C. difficile* had lower levels of lactobacilli ($P < 0.0001$) and cellulolytics ($P < 0.0001$). No effects of antibiotic treatment were observed for *C. perfringens* ($P > 0.05$). These results indicate that antibiotic therapy has negative effects on equine hindgut microflora, even when AAD does not occur.

Key Words: *Clostridia*, *Salmonella*, diarrhea

503 Influence of probiotics on microflora in the gastrointestinal and reproductive tracts of horses. K. Barnhart*[1], J. M. Reddish[1], C. Dyer[1], J. Saul[1], M. A. Coutinho da Silva[2], and K. Cole[1], *[1]Department of Animal Sciences, The Ohio State University, Columbus, [2]Department of Veterinary Clinical Sciences, The Ohio State University, Columbus.*

Current scientific literature is limited on what microorganisms are present in the equine gastrointestinal and reproductive tracts. Microbial populations in these environments can be easily disrupted and probiotics have been utilized in other species to re-establish homeostasis and inhibit the growth of pathogenic bacteria. The objective of this study was to determine whether probiotics could influence the microflora in the gastrointestinal and reproductive tracts of mature horses. Eight Quarter Horse mares (10 ± 2 yrs of age) were randomly assigned to 1 of 2 treatment groups (probiotic or control) for a period of 56 d. All horses received 0.5% BW of a 12% CP pelleted concentrate, with water and mixed grass hay ad libitum. Horses in the probiotic treatment group were fed a supplement containing L. acidophilus at a target dose of 10^9 cfu/45 kg of BW per day. Fecal samples and vaginal swabs were collected weekly to measure pH and evaluate changes in microflora. Uterine swabs were collected when possible during periods of estrus. Mean pH values were analyzed using the PROC MIXED procedure of SAS. A P value of ≤0.05 was considered statistically significant. There were no changes in fecal, vaginal or uterine pH due to probiotic supplementation. Microbial diversity was investigated using PCR with universal primers specific to 16S rRNA gene sequences and subsequent denaturing gradient gel electrophoresis (DGGE) analyses. Images were captured and analyzed with Bionumerics software to compare microbial diversity. PCR using universal primers was successful in amplifying the 200 bp region of interest in all samples. DGGE analysis of fecal and vaginal samples revealed that the control horses had a more diverse microflora compared with the horses given the probiotic. However, DGGE analysis of uterine samples revealed no differences in microbial populations due to the probiotic. The ability of a probiotic to colonize the host may be species and/or environment specific. Further analysis with Lactobacillus specific primers is needed to determine the influence of the probiotic on microbial diversity within the gastrointestinal and reproductive tracts.

Key Words: horse, probiotic, reproductive tract

504 Effects of weight distribution on movement of mature riding horses. H. Roberts,* J. M. Reddish, and K. Cole, *The Ohio State University, Columbus.*

Several studies have shown that a rider's weight can affect the horse's movement. However, horses often carry riders with different skill levels who may or may not distribute their weight evenly. The objective of this study was to determine the effects of even and uneven weight distribution on the movement of mature riding horses (n = 15) at the walk and trot. Every 15 d for a period of 15 wk, each horse was fitted with a surcingle and increasing amounts of weight (13.6 kg evenly distributed, 27.2 kg evenly distributed, and 27.2 kg unevenly distributed), then videotaped in hand at the walk and trot tracking to the right and left on a flat surface. All horses carried each weight each time they were videotaped and the weight was always added in the same order. The camera was positioned at a height of 3.0 m and 8.6 m away from and perpendicular to the line of travel. Videos were analyzed using OnTrack Equine software for stride length, maximum knee angle and maximum hock angle at the walk and trot. The horses were unshod and their hooves were trimmed every 30 d to minimize changes in hoof shape due to normal hoof growth that may affect their movement. Data were analyzed using the PROC GLM procedure of SAS. A P value of ≤0.05 was considered statistically significant. Average stride length at the walk and trot for horses fitted with the surcingle only was 2.19 m and 2.21 m, respectively. There were no differences in average stride length at the walk for horses carrying 13.6 kg or 27.2 kg evenly distributed across their back compared with horses carrying no additional weight. However, a shorter stride length at the walk was observed for horses carrying 27.2 kg unevenly distributed across their back ($P < 0.01$). At the trot, average stride length and hock angle decreased in response to increasing amounts of additional weight and uneven distribution of that weight ($P < 0.01$). Average knee angle at the trot decreased in response to uneven weight distribution but not due to increasing amounts of weight. Overall, the results of this study indicate that additional weight placed on a horse's back and the distribution of that weight can influence the movement of the horse at both the walk and trot.

Key Words: horse, movement, weight distribution