

## Horse Species III

**546 ASAS Centennial Presentation: History and future outlook of equine science teaching programs.** C. H. Wood\*, *University of Kentucky, Lexington.*

Many equine programs began shortly after the enactment of the Morrill Act of 1862 which led to the creation of the land grant university system. During that time horses and mules were used as the main means of transportation and work for agriculture production. Their value and worth were vital to business and the economy. The objectives of this paper are to discuss early equine undergraduate programs, the characteristics of current programs, and what factors will affect the future of equine undergraduate programs. Early equine teaching programs focused on husbandry management practices of horses and mules. As modern farming practice and machinery were developed, the role of the horses and mules in transportation and agriculture production diminished and horses were selected more for performance activities. Universities with equine teaching programs began to introduce minors or options in equine science. In the 1960s and 1970s, many equine teaching programs implemented equitation courses that turned out to be very popular with students but were subsequently eliminated due to the expense and the perceived lack of science involved in the courses. Equine teaching programs have enjoyed renewed invigoration in the late 1990s and early 2000s. Most current equine programs offer research and educational programs for undergraduate students and professional students. The emphasis of current horse programs is equine science and technology, combined with practical aspects of horsemanship, horse training, showing and judging. What factors have led to this increased interest in equine teaching programs? Why are so many land grant universities instituting or expanding their equine programs? Has the equine industry as a whole contributed to this renewed interest? What role will innovations in technology and social networks play in future equine programs? As instructors, how will we incorporate technologies in the classroom or in the extended classroom? Exploring the answers these questions and more will shed light on the future of equine teaching programs.

**Key Words:** Equine, Undergraduate, Teaching

**547 Effect of ad libitum concentrate feeding on cribbing behavior in horses.** T. R. Fenn\*, C. A. McCall<sup>1</sup>, C. E. Eckert<sup>1</sup>, W. H. Brown<sup>1</sup>, and W. H. McElhenney<sup>2</sup>, <sup>1</sup>*Auburn University, Auburn, AL*, <sup>2</sup>*Tuskegee University, Tuskegee, AL*.

Previous research indicates cribbing behavior in horses increases around concentrate meals. This study used 10 mature cribbing geldings to investigate effects of ad libitum concentrate feeding on cribbing behavior. Horses were randomly assigned to either ad libitum feeding (n=5) or control (n=5) groups and were maintained on Bermuda grass (*Cynodon dactylon*) pasture and free choice hay. Each horse was receiving a baseline ration of 1.8 kg of a commercially available pelleted concentrate twice daily at the start of the study (d 0). Control horses remained on this amount throughout the study. Feed for the ad libitum horses was increased to approximately 3.6 kg concentrate four times daily and maintained at this amount for 102 d. Ad libitum horses then were fed 0.9 kg concentrate four times daily (d 103-136) and finally returned to baseline ration (d 137-176). Number of crib bites and duration of crib bouts were recorded for all horses during six 24-h observation periods (d 0, 28, 66, 102, 136 and 170). Data were analyzed as a repeated measures

design which revealed a period by treatment interaction ( $P<0.01$ ) for both total crib bites and total crib bout duration. Preplanned contrasts showed that controls performed  $1222\pm 143$  more crib bites ( $P<0.01$ ) and spent  $110.6\pm 22.7$  min more time performing cribbing behavior ( $P<0.01$ ) than ad libitum horses. When ad libitum horses were fed four times daily (d 103-136), their total crib bites and crib bout duration were not significantly different from control horses. Also, no significant residual effect of ad libitum feeding on cribbing behavior was found when ad libitum horses returned to baseline feeding levels. It is not clear from this study whether the decrease in cribbing behavior seen in the ad libitum horses was the result of additional feed or a change in other factors that accompany concentrate feed delivery in horses. Additionally, ad libitum feeding cannot be considered a viable method to reduce cribbing behavior because of possible negative effects, e.g., obesity, of this feeding regimen on horse health and usefulness.

**Key Words:** Horse, Ad Libitum Feeding, Cribbing Behavior

**548 Epidemiologic and economic study of Hyperelastosis Cutis/HERDA in the quarter horse cutting industry.** S. G. Tipton\*, J. D. Anderson<sup>1</sup>, T. S. Smith<sup>1</sup>, N. J. Winand<sup>2</sup>, P. R. Ryan<sup>1</sup>, R. L. Linford<sup>1</sup>, and A. M. Rashmir<sup>1</sup>, <sup>1</sup>*Mississippi State University, Mississippi State*, <sup>2</sup>*Cornell University, Ithaca, NY*.

Hyperelastosis Cutis (HC) is an autosomal recessive skin disorder in Quarter Horses. Homozygous (Hr/Hr) horses have fragile, hyperextensible skin with skin sloughing and scarring, and are often euthanized. Heterozygous (N/Hr) horses are carriers of the gene, but appear to be normal. The objectives of this study were to evaluate the economic impact of HC within the cutting horse industry and to determine the pedigree relationship of affected and carrier individuals, using SAS Proc Inbreed. Hr/Hr horses (n=194) were identified through DNA and urine testing, or clinical presentation. N/Hr status was then established for an additional 606 horses, including 285 stallions and 265 mares. Records were obtained on the top 100 cutting horses and lifetime earning (LTE) sires within the industry for 1985 through 2006 (Equistat), (N/Hr) horses from these groups were then identified. As of 2006, the cutting horse industry has paid \$388 million to the top 100 sires' offspring, with 23% of those earnings (\$88 million) attributed to the offspring of 12 N/Hr stallions (12%). From 1998 through 2006, these N/Hr sires' offspring earnings increased an average of 0.5% annually, indicating an upward trend. Of the top 100 LTE sires, N/Hr stallions account for 12% and N/N (wild type) for 88%. Thirty three percent of N/Hr sires' offspring earned money with average earnings of \$24,064, compared to N/N sires, with 27% of their offspring averaging \$19,187. In addition, 43% of N/Hr sires' offspring have performed, while only 39% of N/N sires' offspring have performed. Of the approximate 3,500 samples submitted for DNA testing from four continents, 18% of clinically normal cutting horses tested N/Hr. The true prevalence of Hr/Hr horses is difficult to estimate due to the limited number of homozygous horses tested thus far. The large number of heterozygous (N/Hr) horses and the financial impact of this disease on the cutting horse industry emphasize the importance of DNA testing for HC and appropriate breeding selection. This study was supported by AQHA grant number 05070672.

**Key Words:** Hyperelastosis Cutis, HERDA, Quarter Horses

**549 Gastric ulcer incidence rate and relationship to other parameters in 40 Standardbred racehorses.** R. E. Cate\*, B. D. Nielsen, C. I. O'Connor-Robison, H. S. Spooner, J. L. Feldpausch, and H. C. Schott II, *Michigan State University, East Lansing.*

Many studies report incidence rates of gastric ulcers to be 60 to 90% in racehorses. This study was performed to determine the incidence rate in a population of Standardbred racehorses training in Michigan and to determine the relationship of ulcers to other factors that could be evaluated through a physical examination or by obtaining the horse's history from a trainer. The presence or absence of ulcers was confirmed by gastroscopic examination of 40 Standardbreds on two farms (22 horses on farm A, 18 horses on farm B) and given a grade of 0 to 4 where a grade 0 represents no ulceration found. Examinations were conducted during the last two weeks of December and the first week of January and the age of horses (as of January 1st) ranged from 3 to 12 years. Horses were body conditioned scored on a scale of 1 to 9 and trainers were asked to grade the current racing performance of each horse on a scale of A to F with A being best. For statistical purposes, horses were grouped by gender (15 females, 25 males), age (ages 3 and 4 or 5 years of age and older), body condition score (below a BCS of 4.5 or 4.5 and above), and performance (grades A and B or grade C and lower). The incidence rate of ulcers was similar between farms (50% and 56%) but the average (52.5%) was lower than has been typically reported. Ulcer score was not related to gender ( $P = 0.72$ ), age ( $P = 0.48$ ), body condition score ( $P = 0.65$ ), or performance ( $P = 0.55$ ). These findings suggest that the commonly cited incidence rate of ulcers may be too high to be used universally. Similarly, given that only 7 out of 40 horses (17.5%) had a grade 2 or higher ulcer, the impact that ulcers likely cause on performance or health is probably lower than what is commonly believed. This study also confirms a gastroscopic examination needs to be performed to confirm the presence of ulcers despite the belief by many that performance and body condition score can be indicative of their presence.

**Key Words:** Horse, Ulcer

**550 Use of slow-release urea to facilitate composting of horse manure.** S. C. Dilling\* and L. K. Warren, *University of Florida, Gainesville.*

Manure and bedding removed from horse stalls often has a high C:N ratio, thus requiring additional N to facilitate composting. Yet, N loss through volatilization can be significant. This study investigated the use of slow-release N (SRN) sources to promote composting and mitigate N loss from horse stall materials. Materials were amended with urea ( $n=3$ ) or one of two SRN sources: urea formaldehyde ( $n=3$ ) or polymer sulfur coated urea ( $n=3$ ). N-amended treatments were compared to materials that were unamended (CON;  $n=3$ ). All materials were composted for 120 d using an on-farm multiple-bin system. Compost temperature, moisture and  $O_2$  were monitored 3 d/wk. Compost samples were collected at 30 d intervals and analyzed for NDF, ADF, lignin, total N,  $NH_3$ ,  $NO_3$ , total C, pH and microbial populations. Data were analyzed by ANOVA using proc mixed function of SAS (v 9.1) and pdiff for treatment means separation. Temperatures required to destroy parasites and weed seeds were reached within the first 2 wks of composting in all treatments.

Weight and total C of materials were reduced in response to composting ( $P \leq 0.05$ ), but were not affected by N-amendment. Total N decreased during composting ( $P \leq 0.05$ ) with a greater loss of N in all N-amended treatments compared to CON ( $P \leq 0.01$ ). The largest loss of N occurred with urea ( $56 \pm 3\%$ ) compared to SRN sources ( $5 \pm 0.9\%$ ) ( $P \leq 0.01$ ).  $NH_3$  was affected by treatment ( $P \leq 0.05$ ) with a loss occurring in urea, no change in CON and an increase in SRN sources. Composting resulted in an increase ( $P \leq 0.05$ ) in  $NO_3$ , with CON lower ( $P \leq 0.01$ ) than N-amended materials. N-amendment reduced ( $P \leq 0.05$ ) the pH of materials from  $7.5 \pm 0.1$  to  $6.3 \pm 0.2$  during composting. N-amendment had no effect on NDF, ADF, lignin or microbial populations. Collectively, these results indicate that SRN sources reduce the loss of N during composting of horse stall material, but did not necessarily enhance the decomposition process compared to urea. Use of SRN sources may decrease the risk of environmental pollution and increase the value of the composted horse stall material as a fertilizer source.

**Key Words:** Composted Horse Manure, Stall Waste, Nitrogen Amendment

**551 Phosphorus contribution of six equine bedding types.** A. D. Woodward\*, B. D. Nielsen, C. I. Robison-O'Connor, and J. M. Witherspoon, *Michigan State University, East Lansing.*

The objective of this study was to determine differences in P contribution from different bedding materials used in an equine facility. A  $6 \times 6$  Latin Square design was used with 6 horses and 6 bedding materials—shavings (SH), straw (ST), chopped straw (CS), wood pellets (WP), peat moss (PM), and corn cob hulls (CC). Each horse and bedding combination lasted 7 days. Before the commencement of the study, stalls were stripped of any previous bedding material and bedded to an average depth of 12.5 cm with each bedding type. Weight of bedding used was recorded. Waste was removed once daily by the same farm crew, weighed, mixed, and a 10% grab sample was saved. New bedding was weighed and replaced as needed to maintain 12.5 cm. At the end of each 7-d period, all grab samples were pooled, mixed, and a cumulative 10% sample was bagged and frozen at  $-20^\circ C$  for further analysis of P. More CS, PM, SH, and ST were added daily compared to CC and WP (6.5, 4.9, 4.6, and 7.2 vs. 0.0 and 1.3 kg, respectively;  $P < 0.01$ ). Removal of CS, SH, and ST was higher daily compared to CC and PM (17.8, 16.7, and 21.1 vs. 10.5 and 10.6 kg, respectively;  $P < 0.05$ ). Concentration of P in the used bedding was higher in CC compared to SH and WP (2.4 vs. 1.1 and 1.1 g P/kg bedding, respectively;  $P < 0.05$ ) and was higher in CS compared to SH (2.1 vs. 1.1 g P/kg bedding;  $P < 0.05$ ). Concentration of P in the used bedding was also higher in PM compared to CS, ST, WP, and SH (3.1 vs. 2.1, 1.7, 1.1, and 1.1 g P/kg bedding;  $P < 0.05$ ). On a DM basis, results were much the same. Concentration of P in the used bedding was higher in CC compared to SH and WP (5.7 vs. 2.5 and 2.4 g P/kg bedding, respectively;  $P < 0.05$ ) and was higher in PM compared to CS and SH (8.1 vs. 4.2 and 2.5 g P/kg bedding, respectively;  $P < 0.05$ ). These results reveal differences in P contribution of six typical bedding materials used in horse facilities. The knowledge gained from these results can be used to create improved nutrient management practices in horse facilities.

**Key Words:** Horse, Phosphorus, Bedding