T151 Is horse harvesting and processing plants a horse owner solution to the United States unwanted horse population? S. Lindsey and M. Nicodemus*, *Mississippi State University, Mississippi State.*

Unwanted Horse Coalition did a survey in 2009 to determine activities and perceptions related to the United States unwanted horse population. The survey collected solutions to reducing unwanted horse numbers finding the most favored solution by horse owners was the re-opening of horse harvesting and processing plants. Further questions concerning horse harvesting and processing was unavailable on the 2009 survey, and therefore, study objectives were to determine horse owners understanding and perceptions related to horse harvesting and processing plants. Researcher-developed, 15-item survey instrument focused on horse harvesting and processing plants was given to 89 horse owners. For each question the % of respondents selecting an answer was determined. Ownership of 1–3 horses made up the majority of survey respondents (56%) with the Quarter Horse being the most popular breed owned (48%). Only 46% of respondents supported opening horse harvesting and processing plants in their state, and of those not in support, only 25% would reconsider supporting these plants if restrictions were made against processing horse meat for human consumption. The majority (63%) were in favor of additional restrictions on what horses would be harvested with 75% wanting requirements that the horse should be suffering from a health issue. Awareness concerning horse harvesting and processing was lacking as the majority (79%) were unaware of their local facilities and 35% were unaware of the role of United States Department of Agriculture (USDA) concerning these facilities. For respondents aware of USDA involvement, 51% were unclear of all the USDA regulations associated with these plants. The majority (52%) admitted they were unsure of plant practices and handling methods with 46% getting their information from media. While re-opening of these plants is perceived by horse owners as a solution to the current unwanted horse population, survey respondents reflect the need for investigating additional solutions and the need for more thoroughly educating horse owners concerning these plants so they can make a more informed decision.

Key words: unwanted horses, horse ownership

T152 Selenium status declines in horses fed NRC adequate and low selenium diets. M. Brummer*, S. Hayes, J. E. Earing, S. M. McCown, and L. M. Lawrence, *University of Kentucky, Lexington.*

The NRC recommends a selenium (Se) intake of 1 mg/d for a 500kg horse, based on relatively short-term studies showing no added benefit from dietary Se beyond 1mg/d with regards to glutathione peroxidase activity (GPx). Further, the NRC suggests that 1 mg/d may overestimate the minimum Se requirement of mature horses. This study evaluated changes in whole blood Se (WBSe) and whole blood GPx in mature horses fed adequate (AS) and low (LS) selenium diets for 28 wk. This period was selected to allow for near complete red blood cell turnover. Twenty mares and 8 geldings, blocked by age and gender, were randomly allocated to one of 2 treatments. Horses received pasture (Se < 0.06 ppm DM), hay (Se < 0.05 ppm DM) and cracked corn (Se < 0.04 ppm DM). Horses were also individually fed supplements, so that AS (n = 7) and LS (n = 21) received 140% and 70% of daily recommended Se intake, respectively. More horses were allocated to LS in preparation for a subsequent study. Blood samples were taken before and every 4 wks during the study. Data were analyzed as repeated measures using SAS 9.1 and are reported as LS Means. Initial WBSe was similar ($P > 0.05$) between AS (261.1 ng/mL) and LS (251.2 ng/mL). WBSe decreased in both groups over time ($P < 0.05$), but the decrease was greater in LS (treatment x time; $P < 0.05$). Final WBSe was lower in LS (164.7 ng/mL) than AS (211.1 ng/mL; $P < 0.05$). Final WBSe of AS horses was also lower than their initial WBSe ($P < 0.05$). Whole blood GPx decreased over time in AS and LS. Initial GPx was different for AS and LS (72.5 and 61.11 mU/mg Hb respectively), but later time points were similar until the last 3 time points. Final GPx was higher for AS (55.00 mU /mg Hb) than LS (42.72 mU /mg Hb; $P < 0.05$). Final GPx of AS horses was also lower than their initial GPx ($P < 0.05$). The Se status of LS horses depleted over time as expected, but feeding 140% of recommended Se intake did not maintain WBSe or GPx over the 28 wk period. The current recommendation of 1mg Se/d may be enough to prevent deficiency symptoms, but was not sufficient to maintain WBSe or GPx in adult horses in this longer term study.

Key words: glutathione peroxidase, selenium requirement, equine

T153 Round-bale feeder design affects hay waste and intake during horse feeding. K. Martinson*, K. Cleary, K. Ross, J. Wilson, W. Lazarus, W. Thomas, and M. Hathaway, *University of Minnesota, St. Paul*.

Many horse owners find round bales are more convenient, less laborious and expensive, but report hay waste and horse weight gain compared to feeding other hay types. Objectives were to compare hay waste and intake from nine round- bale feeders and a no-feeder control when round bales were fed to horses. Nine round-bale feeders were tested: Cinch Net, Cone, Covered Cradle, Hayhut, Hay Sleigh, Ring, Tombstone, Tombstone Saver, Waste Less, and no-feeder control. Horse groups of similar age, weight, breed, and gender were formed from 25 Quarter Horse and Thoroughbred geldings and mares. Groups of horses were sequentially assigned to feeders using a 5 × 5 Latin Square. Each feeder was placed on the ground in one of 5 outdoor paddocks (30 × 20 m). Using a crossover design, 5 groups of 5 horses were fed in rotation for 4-d. Every fourth day, groups were rotated among paddocks and a new bale was fed. Five feeders were installed for days 1 through 20, and the remaining 4 feeders and the no-feeder control were installed on days 21 through 40. Hay on the ground surrounding the feeder was considered waste, collected daily, dried and weighed. Hay remaining in the feeder at the end of the 4-d period was removed, dried and weighed. Total 4-d hay waste was reported as percent of weight of the original bale minus the remaining hay. Intake was calculated by subtracting waste and remaining hay from original bale weight and dividing that by average initial pen weight. Feeders were compared using PROC Mixed of SAS. Both carryover and period effects were not significant and groups of horses were considered a random effect. Hay waste differed between round bale feeder designs ($P < 0.01$). Mean percent waste was Waste Less, 5%; Cinch Net, 6%; Hayhut, 9%; Covered Cradle, 11%; Tombstone Saver, 13%; Tombstone, Cone, and Ring, 19%; Hay Sleigh, 33%; and no feeder control, 57%. Feeder design did not affect horse intake; all feeders resulted in daily intake at 2.0 to 2.4% of body weight (BW). The no feeder control resulted in less intake at 1.3% BW ($P = 0.001$). The use of a round bale feeder is necessary to avoid excessive hay waste and reduced intake during horse feeding when compared to the no-feeder control.

Key words: round-bale feeder, waste, intake

T154 Glycemic and insulinemic responses of weanling horses to high and low protein diets. A. L. Wagner*[1], R. N. Digianantonio[1], S. L. Tanner[1], R. B. Ennis[1], P. A. Harris[2], J. T. Sylvester[3], and K. L. Urschel[1], *[1]University of Kentucky, Lexington, [2]WALTHAM Centre For Pet Nutrition, Melton Mowbray, UK, [3]Buckeye Nutrition, Dalton, OH.*

Currently, there is a basic understanding of the requirements of dietary protein to optimize growth in the young horse. However, little is known of the effects of dietary protein on the glycemic and insulinemic responses of weanling horses. Characterization of the insulinemic response is critical because insulin resistance has been linked to various diseases such as osteochondrosis. Thus, the objective of this study was to determine plasma glucose (GLC) and insulin (INS) concentrations in 6-mo-old weanling foals (n = 6) receiving isocaloric concentrates with either high (HP; mean ± SD, as fed; 3.04 ± 0.03 Mcal/kg DE; 18.3 ± 0.2% CP) or low (LP; mean ± SD, as fed; 2.86 ± 0.03 Mcal/kg DE; 9.0 ± 0.1% CP) crude protein content. Either HP or LP meals were offered at 1400 (t = 0 min) following an identical meal at 0700 h. Blood samples were collected every 15 min from t = 0 to 120 min, and then at 240 min. Blood samples were analyzed to determine plasma GLC and INS via the YSI Biochemistry Analyzer and Coat-A-Count®RIA kit, respectively. There was no effect of time or treatment on INS ($P > 0.05$). However, both time and treatment affected ($P < 0.05$) plasma GLC concentrations. There was an increase in plasma GLC in the LP compared with the HP group ($P = 0.04$). Specifically, plasma GLC in the LP group was elevated at 15, 30, and 45 min post-feeding over the HP group. However, regardless of treatment, the plasma GLC concentrations of all the foals did not exhibit the typically expected rise post-feeding followed by a return to baseline within the study period. Instead, a decrease post-feeding until t = 30 min was followed by an increase until t = 120 min. It has been previously shown that both INS and GLC show a greater response to feeding after a morning meal in mature horses. Our atypical glycemic and insulinemic responses therefore may be attributed to time of feeding as a result of circadium rhythms. Additional research is however necessary to confirm whether the differences seen are due to the diets or time of feeding in 6-mo-old weanling foals. Funded by Buckeye Nutrition and the WALTHAM Foundation.

Key words: horse, low protein diet, glycemic response

T155 The development, evaluation and implementation of an online safety course for youth working on equine facilities. E. A. Greene*[1], K. L. Waite[2], G. Heyboer[2], J. Whittle[3], C. D. Skelly[2], and K. Vignare[2], *[1]University of Vermont, Burlington, [2]Michigan State University, East Lansing, [3]University of Kentucky, Lexington.*

The estimated 9.2 million horses in the United States provide a popular recreational, competitive and occupational activity for young people. The labor force on equine facilities is often youth who are unpaid or work in exchange for opportunities to ride horses. In 2005, the US Consumer Product Safety Commission reported that an estimated 23,000 youth under the age of 20 years are annually treated in emergency departments for equestrian related injury. Several reports indicate that 20–30% of equestrian-related injuries occur when the handler is either leading or grooming the horse. There is clearly a gap in youth farm safety education for young people working with horses. To date there is no comprehensive, interactive online course designed to educate youth on best safety practices when working on equine facilities. The purpose of this project is to develop, test and implement an educational, interactive and engaging online safety course for youth working on equine facilities. Instant Survey software (www.instantsurvey.com) was utilized to conduct a national survey of adult volunteer horse leaders to identify interest in youth development focused equine courses and important topics. All methods and survey tools were approved by the Institutional Review Board. Data were analyzed using a binomial test via IBM SPSS Statistics 19 software. Approximately 295 online surveys were completed with 98% showing interest in this type of training. When comparing survey topics that received responses of "Very Interested" against "Not Interested" and "Mildly Interested" responses, there was a significant difference ($P < 0.001$) for all items in General Horse Care. Additionally, several national youth and adult focus groups identified horse health, nutrition, exercising horses, legal issues, and safety as critical components of a course. eXtension and My Horse University have partnered to develop 10 online educational units that are currently in peer review process and will be pre-launched for β testing within the next year. This peer reviewed Youth Equine Safety course will be available on the Internet at no charge to the user.

Key words: youth, online learning, equine safety

T156 Greener pastures, stable footing, and seeking balance: An easy-to-use land stewardship series for all horse owners. E. A. Greene*[1], R. Gilker[1], and K. Martinson[2], *[1]University of Vermont, Burlington, [2]University of Minnesota, St Paul.*

As livestock owners come under scrutiny regarding responsible land stewardship and negative impact on water quality, state agencies are implementing more stringent regulations. Horse facilities are also being monitored for nonpoint source pollution from mud issues, run off, and improper manure storage. Also, as feed/hay prices rise, horse owners are seeking maximum pasture utilization as an affordable component of their horses' diet. This educational series provides easy to understand management options for equine operations. The first ("Greener Pastures: Sacrifice a Little Pasture to Save a Lot!") provides horse owners land stewardship and cost information for renovating high traffic areas through written/pictorial methods. "Stable Footing for Your Horse: Practical Strategies for High Traffic Area Renovation" gives additional details for high traffic paddocks and their use in grazing systems. "Seeking Balance: Elements of a Successful Horse Grazing System" outlines strategies for better utilization of a limited land base to improve pasture quality and reduce feed costs. The overall goal is to motivate horse owners to take action to improve pasture quality and land stewardship. These booklets have been introduced in Pasture Walks, Seminars and Workshops throughout the Northeast and Midwest USA. Participants regularly report that they will apply the tools at their own facilities, demonstrating the national relevance of this information. A recent post-program evaluation at the 2010 Minnesota extension program for improving equine pasture and mud management systems measured the material effectiveness. A Likert scale was used to assess participant (n = 70, 60% response rate) knowledge gain on a scale of 1 (very little) to 5 (very much). Participants reported a knowledge increase from 3.2 to 4.1 on the topic of mud management. Furthermore, 85% of participants thought the information would be useful in the management of their horse operation; 58% planned to implement changes based on the presentation. This text and pictorial format provides an applicable method for equine owners to improve their land stewardship.

Key words: high traffic area, pasture, equine

T157 Genetic evaluation of annual earnings in Quarter Horses. J. A. V. Silva*[1], A. P. A. Silva[1], B. Langlois[2], C. B. Cyrino[1], and M.

D. S. Mota[1], [1]*Faculdade de Medicina Veterinária e Zootecnia, Unesp, Botucatu, São Paulo, Brasil,* [2]*Institut National de la Recherche Agronomique, Jouy en Josas, France.*

The aim of this study was to estimate the heritability of the annual earnings (AE) in Quarter Horse races to provide a reliable and objective tool for horse selection for owners, as a previous genetic evaluation of the breeding animals. Data comprised records from 1978 to 2009 with a total of 22,958 races and 5,218 horses, at the Sorocaba Jockey Club, state of São Paulo, Brazil. All the known ancestors of the recorded horses were included in the pedigree file until the fifth generation. The AE was analyzed for animals of 2 (AE2), 3 (AE3) and 4 (AE4) years old, using a multi-trait animal model based on Gibbs sampling algorithm, considering the effects of sex and year of the race, number of starts (covariate), besides the effects of animal, maternal and residual. The estimates of heritability were 0.26 ± 0.10, 0.12 ± 0.04 and 0.31 ± 0.10, for AE2, AE3 and AE4, respectively, and these values were within the range described in literature. The genetic correlations had moderate magnitude and positive values, varied from 0.19, between AE2 and AE4, to 0.52 between AE3 and AE4, suggesting that selection to improve AE at a specific age would promote, to a greater or lesser extent, a favorable genetic alteration in the remainder. Although considering animals with performance at only one racetrack, these results might be considered for future genetic evaluation including horses with performances at other Brazilian hippodromes.

Key words: equine, genetic correlations, heritability

T158 Genetic correlation between racing performance traits in Quarter Horses. M. D. S. Mota[1], B. Langlois[2], R. A. Curi[1], M. C. L. Dal Coleto[1], and J. A. V. Silva*[1], [1]*Faculdade de Medicina Veterinária e Zootecnia, Unesp, Botucatu, São Paulo, Brasil,* [2]*Institut National de la Recherche Agronomique, Jouy en Josas, France.*

Annual earning, an objective measure of horse racing performance, was recorded in 22,958 races and 5,218 animals, at the Sorocaba Jockey Club, state of São Paulo, Brazil. Annual earning measures were recorded for 3-yr-old animals (AE3) and career earning (CE). AE3 was used because it was the age with the greatest number of records in the database studied. In order to achieve a reasonable approximation to the normal distribution, the traits were transformed by log. The traits were analyzed using a multi-trait animal model based on Gibbs sampling algorithm, considering the effects of sex and year of the race, number of starts (covariate), besides the effects of animal, maternal and residual. The covariate age at last race was included for CE. The heritability estimates for AE3 and CE were 0.18 ± 0.04 and 0.19 ± 0.04, respectively. Genetic correlation across annual earning measurement was 0.97 ± 0.02, indicating a strong underlying genetic basis. The estimates for the simple correlation (Pearson) and for the rank correlation (Spearman) between classifications by breeding values of the top twenty animals considering AE3 were significant ($P < 0.01$) and both with high values (0.80 and 0.84, respectively). Selection based on measures of annual earning at three years old described in this study could be used to predict career performance in the Quarter Horse.

Key words: animal model, career, earning

T159 Genome-wide association of polymorphic gait in the horse. E. A. Staiger*[1], R. R. Bellone[2], N. B. Sutter[3], and S. A. Brooks[1], [1]*Department of Animal Science, Cornell University, Ithaca, NY,* [2]*Department of Biology, University of Tampa, Tampa, FL,* [3]*Department of Clinical Science, College of Veterinary Medicine Cornell University, Ithaca, NY.*

Following domestication, man selected the horse primarily for the purpose of transportation, rather than consumption; thus resulting in the appearance of divergent genetic traits for locomotion. In this regard the horse is a unique model for the study of gait development, as no other mammalian species is known to discretely segregate for preference in cadence and footfall patterns. At intermediate speeds, beyond the flat walk, horses can perform a range of diagonal and lateral, 2-beat or 4-beat, gaits known as trot, pace, foxtrot, rack, and running walk. Although heritability is unknown, a strong role for genetics is supported by the discrete segregation among breeds for the propensity to perform one gait or another indicating that genetic alleles contributing to gait type will be higher in breeds with the ability than those without, regardless of the subsequent influence of training. Our study aims to leverage this genetic trend by identifying loci common in gaited breeds and rare in trotting breeds. To investigate the contribution of genetics to this unique trait, blood or hair samples were collected from each of 3 horses representing 32 diverse breeds. For 3 of these breeds (Paso Fino, Icelandic Horse and American Saddlebred) the ability to perform a lateral 4-beat gait is a key characteristic of the breed. DNA from each these 95 horses were genotyped at 54,602 loci using Illumina Equine SNP50 beadchip at GeneSeek Inc. (Lincoln, NE) or the Genotyping Shared Resource at the Mayo Clinic (Rochester, MN). We used PLINK V1.07 (Purcell, 2007) to simultaneously test the resulting 5 million plus genotypes for significant association within naturally gaited breeds. Allelic association identified 2 independent statistically significant loci at ECA18 and ECA11 for a lateral 4-beat gait (Bonferroni adjusted *P*-values of 2.39E-09, and 7.46E-09). Confirmation of association by genotyping large populations segregating for gait type and sequencing of candidate genes at each of these loci is currently underway.

Key words: association test, horse, gait

T160 Aromatherapy treatment in horses. C. E. Ferguson*, H. Klienman, A. L. Browning, J. Browning, and E. L. Ferguson, *McNeese State University, Lake Charles, LA.*

In the equine industry an acute fear stress response can be deleterious to production. A novel treatment (trt) to reduce the effects of this stress response in excitable horses would benefit the equine industry. The objective of this experiment was to determine if aromatherapy using 100% lavender essential oil would reduce acute stress response in horses. A total of 7 mature horses were used in this experiment following a Latin square design where each horse received each trt 7 d apart. This procedure was performed with groups of 4 horses at a time with 2 receiving the control trt and 2 receiving lavender trt in a barn isolated from other study horses. The heart rate (HR) and respiratory rate (RR) was recorded for each horse at rest in a stall (−1 min) and then an air horn was blown (between 2 adjacent stalls) for 15 s, twice (0 min). The horses were allowed 60 s to calm and then the stressed HR and RR was recorded (1 min). Then control horses were treated with humidified air and aromatherapy horses were treated with humidified air with a 25% mixture of 100% pure lavender essential oil for 15 min. Following the 15 min control or aromatherapy trt the recovery HR and RR was recorded (15 min). The change in HR or RR was calculated by subtracting the recovery HR or RR (15 min) from stressed HR or RR (1 min). All statistical comparisons were performed using SAS Proc GLM. There were no statistical differences ($P > 0.05$) between the control and aromatherapy trt for resting HR 33.7 ± 3.6 vs. 34.0 ±

3.1 bpm (beats per min), stressed HR 38.8 ± 3.9 vs. 45.5 ± 5.3 bpm or recovery HR 39.14 ± 3.3 vs. 36.2 ± 3.8 bpm. However, the change in HR was significantly greater ($P < 0.02$) following aromatherapy −9.25 ± 3.4 bpm compared with the control trt 0.29 ± 1.5 bpm. The RR did not differ statistically ($P > 0.05$) between the control or aromatherapy trt for the resting 21.1 ± 1.4 vs. 21.5 ± 2.6 brpm (breaths per min), stressed 21.1 ± 1.7 vs. 19.6 ± 1.8 brpm and recovery, 20.3 ± 1.5 vs. 16.5 ± 1.2 brpm. These results demonstrate that lavender aromatherapy can significantly decrease heart rate following an acute stress response.

Key words: stress, horses, aromatherapy

T161 L-Arginine supplementation increases ovarian blood flow in postpartum mares. D. E. Kelley*, L. K. Warren, and C. J. Mortensen, *University of Florida, Gainesville.*

L-Arginine (ARG) is a precursor for protein synthesis and other bioactive compounds such as nitric oxide, polyamines, proline, creatine and glutamate. Nitric oxide has potent vasodilative properties and is important in regulating blood flow and angiogenesis. Supplementing diets with ARG has been shown to improve female reproductive performance in other species. The objectives of this study were to evaluate the effects of ARG supplementation on blood flow to the ovary in postpartum mares during the foal heat cycle. Mares were blocked by age, breed and expected foaling date (EFD) and then assigned randomly within block to one of 2 treatments: ARG supplementation (n = 8) or non-supplemented control (n = 8). Treatment mares were supplemented with 100g of ARG once daily mixed into the morning feeding beginning 21 d before the EFD. Mares underwent daily ultrasound examination beginning the day following parturition utilizing a digital color Doppler ultrasound (Micromaxx, Sonosite, Bothell, WA). Spectral-Doppler measurements (pulsatility index) were recorded for both ovarian arteries and calculated by the algorithm package in the Micromaxx ultrasound. Continuous data were analyzed by MIXED procedures of SAS (version 9.2; SAS Institute, Cary, NC) while data from a single day was compared using Student's *t*-test. Results indicated ARG-supplemented mares had improved blood flow to the ovulatory ovary before ovulation ($P \leq 0.05$). There was no difference between groups on arterial blood flow to the nonovulatory ovary. Perfusion to the ovulatory follicle on the day before ovulation tended to be greater in ARG-supplemented mares compared with control (40.6 ± 4.7% versus 28.6 ± 6.9%, respectively; $P = 0.08$). No differences were found between groups in the diameter of the dominant follicle at ovulation. Blood flow plays an important role in ovarian function and follicular perfusion has been correlated to increased pregnancy rates. Additionally, the lower perfusion of the preovulatory follicle in control mares raises the question of whether reduced ovarian blood flow following parturition may contribute to the reduced fertility associated with this period.

Key words: mare, ovary, blood flow

T162 Using glycerol-^{3}H to evaluate equine blastocyst capsule permeability. B. R. Scott*[1], D. B. Carwell[1], R. A. Hill[1], K. R. Bondioli[1,2], R. A. Godke[1,2], and G. T. Gentry[1,2], *[1]School of Animal Sciences, Louisiana State University AgCenter, Baton Rouge, [2]Reproductive Biology Center, Louisiana State University AgCenter, St. Gabriel.*

The limited success of the cryopreservation of equine blastocysts may be due to the presence of the glycoprotein capsule surrounding the early stage equine embryo preventing penetration of cryoprotectants. Currently, equine embryos destined for cryopreservation are collected from mares on d 6 post-ovulation at the morula stage because of higher survival rates following cryopreservation. Therefore, the objective of this study was to verify capsule impermeability by quantifying the amount of tritiated glycerol uptaken by equine blastocysts with intact capsules. Light horse mares of various breeds were used in this study. The mares (n = 14) ranged in age from 3 to 18 yrs and were in good body condition. Estrus detection was performed by chute teasing with a stallion and ovulation was predicted by transrectal ultrasonography followed by artificial insemination and nonsurgical embryo collection on d 7 post-ovulation. Recovered equine blastocysts (n = 30) were randomly assigned to 2 treatment groups. Embryos were incubated in a 500-μL drop of 1.4 *M* or 3.4 *M* tritiated glycerol with a total activity of 20 μCi for 15 min. After incubation embryos were washed 3 times in 500 μL of unlabeled glycerol identical to the treatment concentration. All samples were transferred to 1.5 mL microcentrifuge tubes and incubated overnight in 400 μL of nitric acid at 37°C. After incubation, vials were vortexed for 2 min and 350 μL of the supernatant was transferred to a scintillation vial and mixed with 5 mL scintillation fluor. Samples were then counted on a liquid scintillation counter with 65% efficiency. Results were then converted from disintegrations per minute to percent uptake of labeled glycerol by volume of the individual embryo. There were no differences ($P = 0.32$) in tritiated glycerol uptake between the 1.4 *M* (2.6% ± 1.4%) and 3.4 *M* (1.22% ± 0.53%) treatment groups, however, embryos <400 μm in the 1.4 *M* treatment had a higher glycerol concentration (8-fold increase) compared with embryos >400 μm ($P = 0.002$). This indicates the capsule may not be fully developed in the smaller embryos. These data further suggest that the capsule may be a cryoprotectant permeability barrier.

Key words: equine, cryopreservation, capsule

T163 Effect of centrifugation/freezing extenders and sperm concentrations on post-thaw motility and membrane integrity of frozen-thawed stallion spermatozoa. C. S. Ballard*[1], C. G. Loretan[2], and J. B. Davis[2], *[1]William H. Miner Agricultural Research Institute, Chazy, NY, [2]University of Vermont, Burlington.*

Two experiments were designed to compare combinations of centrifugation and freezing extenders and effect of spermatozoal concentration on post-thaw quality of frozen stallion semen. Three ejaculates from 3 Morgan stallions were collected in June/July, divided equally and assigned to a 2 × 2 factorial arrangement of centrifugation media (Kenneys Modified Tyrodes (KMT) or INRA96) and freezing media (lactose-EDTA-egg yolk containing 20% egg yolk and 5% glycerol (LAC-EDTA) or INRA-Freeze). Centrifugation media was added 1:1 to raw semen, equilibrated at room temperature for 10 min and centrifuged at 500 x g for 20 min. Supernatant was removed and sperm pellet resuspended with respective freezing media to a concentration of 100×10^6 sperm/ml. INRA-Freeze was cooled at 5°C for 75 min and loaded into 0.5 mL straws. Sperm resuspended with LAC-EDTA equilibrated at room temperature for 20 min before loading into 0.5 mL straws. All straws were frozen in vapor phase of liquid nitrogen (LN) for 10 min before immersion in LN. In Experiment 2, 3 ejaculates were collected in Dec/Jan from 2 of the same Morgan stallions and processed using KMT and LAC-EDTA based on the outcome of Exp. 1. After centrifugation, sperm pellets were resuspended with LAC-EDTA to one of 3 spermatozoal concentrations: 100, 250 or 500×10^6 sperm/ml and processed according to procedures described previously. For both studies, post-thaw progressive motility and membrane integrity (hypo osmotic swelling) were assessed and analyzed using the Proc Mixed procedures of SAS. Centrifugation media did not affect sperm

quality post-thaw (P = 0.94). Progressive motility and membrane integrity post-thaw was significantly higher for LAC-EDTA extender (37 vs. 31%, P = 0.03; 15 vs. 11%, $P \leq 0.01$, respectively). Post-thaw quality of sperm was similar for all freezing concentrations ($P \geq 0.10$). Under the conditions of this study, KMT and LAC-EDTA were the best extenders for processing and freezing stallion spermatozoa at concentrations ranging from 100 to 500 × 10^6 sperm/ml.

Key words: equine, spermatozoa, cryopreservation

T164 Evaluation of hCG or Deslorelin for enhancing ovulation and subsequent pregnancy rate in mares in a commercial setting. M. M. Tondre[1], M. M. Vogelsang*[1], C. A. Cavinder[1], C. M. Honnas[2], and S. G. Vogelsang[3], *[1]Texas A&M University, College Station, [2]Texas Equine Hospital, Bryan, TX, [3]Equine Reproductive Consultant, Hearne, TX.*

The variation in length of estrus, time of ovulation during estrus and size of the follicle at ovulation contribute to increased expense and decreased efficiency of breeding mares in today's horse industry. Inefficiency increases when using frozen semen or semen from stallions of marginal fertility. The purpose of this study was to compare efficacy of hCG and Deslorelin (IM) for enhancing ovulation in the mare. Breeding records of 153 mares at a commercial breeding facility were evaluated. The mares were administered either 2500 IU hCG (Chorulon; Intervet Inc., Millsboro, DE) or 1.5 mg/ml Deslorelin (Applied Pharmacy Services, Mobile, Al) after detection of a follicle >35 mm. Thirty-five mares received the hCG injection, 40 mares received the Deslorelin injection and 78 mares did not receive any treatment. Mares were inseminated using fresh, extended semen or cooled transported semen before ovulation. Pregnancy determinations were made using ultrasonography at d 15 and d 30 post-ovulation. Data were analyzed using χ^2 and values were considered significant at $P < 0.01$. Use of hCG (31 of 35; 88.6%) or Deslorelin (36 of 40; 90%) provided similar results for inducing ovulation within 48 h after detection of a 35 mm follicle. However, in untreated mares (17 of 78; 22%) fewer ovulated by 48 h and most took longer to achieve ovulation (15 by 72 h, 30 by 96 h). Pregnancy rate among the 3 groups of mares was not different (hCG, 58%; Deslorelin, 61% and untreated, 69%). In this study, the use of either hCG or Deslorelin for inducing ovulation within 48 h post-treatment yielded similar results. Pregnancy rates between the treatments were similar although not higher than in the mares which were not treated. The use of ovulation-enhancing hormonal stimulation is beneficial in the commercial horse breeding industry. If the time to ovulation can be more precisely controlled, more efficient use of the stallion can be made. Based on this and other studies, the choice of which product to use can rest with the breeding manager without having to be concerned about loss of effectiveness.

Key words: mares, hCG, Deslorelin

T165 Endoscope-guided insemination for off-season mares. G. Rocha-Chavez[1], J. C. Franco[1], E. O. Garcia[2], A. Sepulveda[1], J. G. Gonzalez[1], J. Torres[1], J. M. Tapia[1], and O. Montañez*[1], *[1]CUSUR Univ de Guadalajara, Guadalajara Jalisco Mexico, [2]CUCOSTA SUR, Autlan Jalisco Mexico.*

Although breeding season for equine arrives with the spring, in Mexico mares can be found cycling thorough the entire year and late born foals are always welcomed. The objective of this study was to determine fertility of mares inseminated with frozen/thawed semen during fall using the endoscope as a guide. Twelve mares of known fertility were inseminated deep in the uterine horn with 200 thousand frozen thawed spermatozoa with at least 30% motility. Mares were programmed to be inseminated no more than twice during this season and the estrous cycle was closely monitored via ultrasound to ensure insemination within 4 h post ovulation. Insemination was done with flexible intrauterine pipette guiding a 0.5 mL straw containing the thawed stallion semen that was deposited near the uterotubal junction. Pregnancy diagnosis was made 17 d post ovulation and pregnancy rates (PR) were compared using chi-squared test with same type of insemination made during spring without the aid of endoscope. PR was better for the fall group ($P < 0.05$) as illustrated in Table 1. More research is needed for off-season mares.

Table 1. Pregnancy rates of mares inseminated either on spring or fall

Season	No. of mares	Mares pregnant	Rate
Spring	12	5	41.6[a]
Fall	17	9	52.9[b]

[ab]Differ at $P < 0.05$.

Key words: insemination, mares, off-season