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## Broodmare Nutrition: Preparing for Fall and Winter

### Body Condition

All broodmares should have their body condition assessed regularly, as mares in good condition have a reservoir of stored fat they can use during cold winter weather. Good body condition also helps barren and maiden mares establish normal cycles sooner in the breeding season and results in higher conception rates. Similarly, mares in good body condition at foaling are easier to rebreed than thin mares.

Owners can usually assess a horse's body

condition by evaluating the amount of fat deposited on the ribs, along the neck and spine, and behind the shoulder. The typical scoring system uses a 1-to-9 scale, where a horse with a score of 1 is emaciated and 9 is obese. A horse with a condition score of 5 is considered to have "moderate" body condition. Mares that enter the breeding season with a condition score below 5 have reduced reproductive efficiency. Therefore, the target body condition score for broodmares is at least 5. While there is no advantage to a

mare having a very high score (being very fat), if she has a score of 6 in late fall she will have a small reserve of fat during winter when she will be burning extra calories to stay warm.

Horses with body condition scores between 5 and 6 have ribs that can be felt easily, but that are not visible. In addition, these horses have enough fat cover over their topline that the loin area is relatively flat. Their necks are not thin

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ANNE M. EBERHARDT

Pastured mares' diets might need to be supplemented with hay during winter months.

## (BROODMARE NUTRITION ...)

and blend smoothly into the shoulder. A horse with a score higher than 7 has ribs that are difficult to feel and so much fat along the spine that there is a deep crease in the loin area. On the other hand, if the spine is visible along the loin area and the ribs are also visible, then the body condition score would be closer to a 4. If more of the mare's bony structures are visible (e.g., the shoulder or hip bones are prominent) then the body condition score would be below a 4.

Many mares that nursed a foal during the summer and early fall as well as mares used for strenuous competitive activities during the summer (racing, endurance competition, polo, etc.) often enter the fall with condition scores below 5. These horses will need to consume extra calories in the fall to ensure they are in good body condition for the next breeding and foaling season.

Mares that have been grazing abundant, high-quality pasture all summer and fall might have body condition scores above 7. Although high condition scores have not been shown to negatively affect reproduction, they might increase a mare's risk for limb and hoof problems, including laminitis. If a horse is overweight, winter is a good time for weight loss because the pasture is less nutritious and the cold weather increases calorie use.

### **Pasture and Hay**

As pasture quality and quantity decline in late fall, owners should supplement mares' forage intake with hay. While some horse managers in

Central Kentucky begin feeding hay to pastured mares beginning Nov. 1, you should make a decision based on the condition of your individual mares and pasture. If the mares are losing body condition, the nutrients available to them are likely insufficient. Even if the mares seem to be maintaining body condition but the pasture is showing signs of overgrazing, it is probably time to offer hay. Providing hay in the fall will serve two purposes: First, it ensures mares will have enough to eat; and second, it might reduce overgrazing of the pasture. Overgrazing in the fall can weaken the plants, thus reducing their vigor the next spring and summer. Overgrazing can also allow more weeds to invade the pasture.

The best way to evaluate whether pastured mares need hay is to put some in the pasture. If the horses ignore the hay, then the pasture is probably meeting their forage needs. If they eat some but not all of the hay, then the amount of hay fed can be reduced until the amount that remains at the next feeding is small. If the horses devour the hay rapidly, the pasture quality is clearly declining and the horses need hay.

Many types of hay are acceptable for broodmares, but the main selection characteristics should be safety and nutrition. Most tall fescue in the southeastern United States is infected with a fungal endophyte that can negatively affect mares in late gestation. Unless tall fescue hay has been tested and is known to be endophyte-free, it should not be fed to mares, especially pregnant mares. Any hay that is fed to horses should also

be free of toxic weeds, dust, and mold.

Legume hays (e.g., alfalfa and clover) are higher in nutrients than most grass hays (timothy, orchardgrass, etc.). In a recent study conducted at the University of Kentucky (UK), Thoroughbred mares in mid and late gestation were able to eat enough good-quality alfalfa hay to meet their protein requirements. Mares fed timothy hay were able to eat enough hay to meet their protein requirements in mid-gestation, but not in late gestation. When applied to practical feeding situations, these results mean horses fed good-quality alfalfa hay will require less concentrate (sweet feed or pellets) than horses fed timothy hay.

In addition to considering the type of hay to use, a broodmare owner might want to estimate how much hay he or she will need to provide during the fall and winter. In the UK study mares consumed about 2-2.25 pounds of hay for each 100 pounds of body weight. So a medium-sized Thoroughbred mare (1,250 pounds) would consume about 25-28 pounds of hay daily. Remember that this figure represents the amount of hay consumed, not the amount fed. There will always be some wasted hay, so the amount fed should be slightly greater than the amount to be consumed. The mares in the study received only a small amount of concentrate each day, and mares fed greater amounts of concentrate would need less hay. If hay is fed at 30 pounds/horse/day from Nov. 1 through March 30, then a little more than two tons of hay will be needed to feed the medium-sized mare over this period.

## (BROODMARE NUTRITION ...)

If the hay feeding period is longer or shorter, or the mare is expected to eat more or less hay, then the total amount of hay would change.

### Concentrates and Supplement Pellets

In addition to pasture and/or hay, broodmares are usually fed either a commercially manufactured concentrate or supplement pellet (sometimes called a balancer pellet). The term “concentrate” refers to a feed that is a concentrated source of calories. Common concentrates such as oats, corn, and other cereal grains are good sources of calories but they are low in calcium and other necessary nutrients. Commercially manufactured concentrates usually include cereal grains, but they also contain additional nutrients. If a concentrate is formulated for a broodmare, the level of nutrient supplementation will be targeted to meet her needs.

Concentrates should be added to the diet when the forage portion does not provide enough calories to meet a mare’s needs. Most Thoroughbred-type mares should receive 5-10 pounds of concentrate per day in late gestation. Mares from small, thrifty breeds will usually be fed less concentrate in late gestation.

Supplement pellets are concentrated sources of vitamins, minerals, and sometimes protein. They are fed in small amounts (usually 1-2 pounds per day) when the pasture or hay provides all the calories a mare needs. For example, if a mare can maintain a condition score of 6 on pasture or hay alone, then she does not need the

## WEED OF THE MONTH


**Common names:** Henbit, *Lamium amplexicaule* L.  
**Purple deadnettle,** *Lamium purpureum* L.  
**Life Cycle:** Winter annual  
**Origin:** Europe  
**Poisonous:** No

Henbit and purple deadnettle are winter annual species of the same genus and are frequently confused with each other. Both species are often called henbit. These weeds germinate in the fall and sometimes in the spring. They are found throughout the eastern United States and thrive in both cool season and warm season forage grasses. Both species also grow in fine turf, orchards, gardens, landscapes, and cultivated crops.

Henbit flowers are pink to red and occur in clusters, 6 to 10 inches tall in the upper leaf stalks. Purple deadnettle flowers occur near the tops of the plant and are less purple than henbit flowers. The most striking difference is that the purple deadnettle’s upper leaves and stems are very red in appearance compared to henbit.

These weeds are relatively easy to control with several herbicides; however, mowing is ineffective. Consult your local Cooperative Extension Service personnel (<http://ces.ca.uky.edu/ces>) for herbicidal control in your area. **UK**

*William W. Witt, PhD, a researcher in Plant and Soil Sciences, provided this information.*



**Henbit (top) and purple deadnettle (bottom).**

extra calories provided by a concentrate. But, she does need many of the minerals provided in the supplement pellet. Supplement pellets are not needed if a mare is getting at least 4 pounds of a commercially manufactured broodmare concentrate. However, a supplement pellet can be

combined with a plain cereal grain (such as oats) if an owner prefers not to use a commercially manufactured feed. **UK**

*Laurie Lawrence, PhD, a professor in the Department of Animal and Food Sciences at the University of Kentucky, provided this information.*

## Kentucky Equine Receipts Might Stabilize in 2011

Strong cash receipts will likely propel Kentucky's agricultural sector, including equine, forward again in 2011, according to Kenny Burdine, extension specialist in the University of Kentucky's (UK) Department of Agricultural Economics. Burdine made this prediction as he analyzed 2010 cash receipt estimates for Kentucky, released recently by the USDA.

Figures for 2010 showed that poultry again supplanted the Bluegrass state's trademark equine industry to notch the No. 1 spot in total farm receipts, at 21% of the \$4.4 billion total. The university's Agricultural Economics extension economists, including Burdine, estimated in December that 2010 overall farm receipts would reach \$4.5 billion. Their estimates for 2011, if reached, would be a milestone for Kentucky: a projected \$5.1 billion.

"Equine led the state's cash receipts for five or six years, reaching a high in 2007 at just over \$1.1 billion," Burdine said. "Since then, however, equine receipts have pulled back by roughly 38%." The 2008 recession hurt the major horse sales and affected stud fees, both of which

weighed heavily on the market and contributed to the equine industry's weakness, according to Burdine. He predicts 2011 will be a relatively strong year for Kentucky's equine sector, indicating it could reach \$725 to \$750 million, compared with \$700 million in 2010 and \$780 million in 2009, though he cautions it could fall to third or fourth in Kentucky's farm receipts by percentage.



ANNE M. EBERHARDT

Keeneland's September yearling sale showed signs of the industry's recovery.

After the 2008 recession most agricultural sectors in Kentucky recovered quickly, but strength in the equine sector was slow to return. Currently, hay is a promising indicator of equine's recovery. Kentucky saw a 20,000-acre increase in alfalfa hay acres from 2010 to

2011, yet also saw a much larger decrease in total hay acreage.

"The trend of increasing acreage in alfalfa is most likely due to better weather and overall increases in feed costs making quality hay more attractive," Burdine explained. "The decrease in nonalfalfa hay acreage is likely caused by declining cattle numbers and increased competition for ground for row crop production."

Stud fees continue to be a crucial driver for equine receipts. Among sires standing for the highest stud fees (more than \$25,000), 100% are based in Kentucky. Conversely, among sires standing for less than \$5,000, only 8% stand in Kentucky, according to The Jockey Club.

"Stud fees in 2011 were most likely steady from 2010," Burdine said. "So, steady stud fees and moderately stronger sales should mean slightly higher receipts in 2011."

The marquee Keeneland September yearling sale was an international benchmark for the entire

industry, concluding with a rise in gross, average, and median, despite a decline in the number of horses sold. These are all positive signs of recovery for the Thoroughbred industry. **UK**

*Karin Pekarchik is an editorial officer in UK's Agricultural Communications Services.*

## Mare Response to Endometritis Treatment

In September Mats Troedsson, DVM, PhD, Dipl. ACT, ECAR, professor and director of the University of Kentucky (UK) Gluck Equine Research Center and chair of the department of veterinary science, lectured at UK's Veterinary Diagnostic Laboratory on endometritis.

"Endometritis is a fine-tuned interaction between the host immune system and invading agent for which targeted treatment works best," he said. "It is important to distinguish between 'normal' and 'abnormal' mares, since only 10-15% of broodmares are susceptible to persistent endometritis."

Endometritis is an inflammation of the lining of the uterus that can be caused by breeding or introducing bacteria into the uterus. Typically, endometritis resolves quickly, but in some mares chronic, recurrent uterine inflammation is a persistent problem that can interfere with pregnancy.

"While most young mares have a remarkable ability to clear inflammation, older, multiparous (having foaled two or more times) mares can fail to clear contaminants from the uterus and are considered 'susceptible,'" Troedsson said.

Several issues can contribute to susceptibility. Delayed uterine clearance might be caused by impaired myoelectrical activity (electrical activity in the muscle) or other uterine pathologies (Woodward et al). Horizontal uterine placement allows the mare to

more readily clear pathogens than a pendulous (i.e., downward facing, or slanted) uterine placement. In studies, susceptible mares accumulated nitric oxide following induced inflammation, which impairs smooth muscle contraction, thereby inhibiting uterine clearance, Troedsson said.

**"Endometritis is a fine-tuned interaction between the host immune system and invading agent for which targeted treatment works best."**

**Dr. Mats Troedsson**

"Recent data from our laboratory suggest that the innate immunity may play an additional role in the development of susceptibility to persistent endometritis," Troedsson said. "It is not clear at this time, however, how cytokine (a mediator of inflammation) expression and impaired uterine contractility are connected. More research in this area is needed."

### Breeding-Induced Endometritis

Breeding-induced endometritis is normal and serves to clear the uterus of excess semen and contaminants, Troedsson explained. During this transient inflammation, which most mares resolve in 24-36 hours, there is a quick expulsion of sperm from the uterus. If not resolved in a timely fashion, the inflammation will create a uterine environment that is harmful to the embryo and often results in pregnancy loss.

With persistent breeding-induced endometritis:

- Uterine contractility is impaired, resulting in delayed uterine clearance;
- Impaired cytokine modulation appears to play a role in susceptibility; and
- Six hours is the critical timeframe to clear breeding-induced endometritis.

When treating breeding-induced endometritis, lavage (flushing) and low doses of the naturally occurring hormone oxytocin can help the uterus clear the inflammation, Troedsson explained. Low doses of oxytocin (5-20 units) result in beneficial muscle contraction, whereas higher doses (30-40 units) result in a disadvantageous muscle cramp.

Use of prostaglandin F2α rather than oxytocin has also been shown to aid uterine clearance. If administered after ovulation, however, this treatment could be detrimental to fertility by delaying corpus luteum (an ovarian follicle after discharge of the egg that secretes the hormone progesterone) development.

"With prostaglandin, we are administering it to treat fertility, but we have found it may reduce the chance of pregnancy if given at the wrong time," Troedsson said.

According to Troedsson, causal agents of infectious endometritis include:

- *Streptococcus equi* sp *zoepidemicus*
- *Escherichia coli*
- *Pseudomonas aeruginosa*
- *Klebsiella pneumoniae*
- *Taylorella equigenitalis*

## (ENDOMETRITIS ...)

In bacterial infections:

- There is an increased endometrial gene expression of cytokines that helps to clear the infection;
- There are imbalanced cytokine responses to infection in susceptible mares; and
- Cytokine response might differ in response to infection and breeding.

“To treat infectious endometritis, you must treat the underlying breakdown of uterine defense and administer antibiotics,” Troedsson said. “Most mares respond well to antibiotic treatment, which includes intrauterine infusion, systemic treatment, or both.

“Some mares develop recurrent endometritis, which can be very resistant to antibiotics,” he

continued. “One theory is that the infectious agent is protected by a biofilm, a group of microorganisms growing on a solid substrate that are resistant to antibiotics. For a treatment to be effective, it must break down the biofilm. Although the endometrium is a likely environment for bacteria to build up a biofilm, it has not yet been proven. Another cause may be the presence of dormant bacteria in the endometrium.”

This has been demonstrated by Danish researchers and suggested to be a cause of persistent endometritis.

Both the immunostimulant Settle and corticosteroids had a significant effect on clearing uterine pathogens. The effect of treatment on endometrial

cytokine expression was less clear, and the mechanism is still unknown with regards to these and other alternative treatments.

Troedsson explained that several teams at universities around the world are currently researching the underlying causes and best treatment options for the 10% of susceptible mares that suffer from persistent endometritis.

“Ongoing research contributes to the body of knowledge, but the causative agents and best treatments remain ill-defined,” he said. “There is a gray zone between resistance and susceptibility to endometritis.” **UK**

*Karin Pekarchik is an editorial officer in UK's Agricultural Communications Services.*

## Planning for Winter on Kentucky Horse Farms

Planning for winter now can help Kentucky horse owners avoid weather-related inconveniences when the cold arrives.

University of Kentucky (UK) experts offer several recommendations for winter preparation, such as anticipating hay purchases for the season. Calculate needs ahead of time, and place orders with hay producers for the amount of hay you will need for the winter feeding period.

“The hay supply may get tight if people start buying,” said Bob Coleman, PhD, PAS, associate director for undergraduate education in equine science and management and extension horse specialist at UK. “It’s more of a national marketplace now, and in other areas of the country hay could be in



ANNE M. EBERHARDT

**Calculate hay needs before winter sets in.**

short supply. I'd have hay sourced soon.”

Plan how and when the hay will be delivered and stored throughout the winter. Clean hay storage areas to ensure nothing will attract raccoons or other vermin. Remember to store hay in a building that has all-weather access.

“Test hay for quality as soon as it is delivered if a test is not provided when the hay is purchased,” said Tom Keene, hay specialist in UK's Department of Plant and Soil Sciences. “Buy hay by the ton if at all possible and require certified stamped weight.”

- Build a high traffic pad to reduce wasted feed and reduce muddy areas and to control erosion. “They make it easy to feed and easy to clean,” Coleman said. “Feeding hay on the ground can waste up to 50% of the hay offered, which can almost double expenditures.” For more on high traffic pads, see the UK Cooperative Extension Service publication, “High

## (PLANNING FOR WINTER ...)

Traffic Area Pads for Horses,” [www.ca.uky.edu/agc/pubs/id/id164/id164.pdf](http://www.ca.uky.edu/agc/pubs/id/id164/id164.pdf).

- If pastures are not in use, consider dragging them. Dragging helps degrade fecal material, but it’s controversial because it might also spread parasites. Timing must be considered carefully, because the field will need to remain out of use for a period before horses are reintroduced to limit exposure to parasites.

**“Feeding hay on the ground can waste up to 50% of the hay offered, almost doubling expenditures.”**

**Dr. Bob Coleman**

- Check that all waterers, hydrants, and pipes are fully functioning. Insulate or use heat tape if necessary. Consider installing additional waterers if the increased capacity is needed. “You want to be at capacity, not under or over, to efficiently move water through to prevent freezing,” Coleman explained. “It’s not much fun to thaw out a frozen waterer.”
- Assess your horses’ nutritional needs and body condition scores (BCS). “Determine each horse’s BCS, keeping in mind that scores of 5 to 6 are fine.” Coleman said. “This could mean increasing, maintaining, or restricting feed, depending on the horse’s BCS. Making changes to a horse’s BCS is much easier in the fall than trying to feed to gain condition at a time when maintenance requirements

are increased due to cold, wet, and windy conditions in January or February. This is particularly true for horses that are maintained outdoors.”

Fall is an optimum time to establish many plants, shrubs, and trees. Rick Durham, extension professor and coordinator for the Kentucky Extension Master Gardener Program in UK’s Department of Horticulture, advised the following:

- If fertilizing pastures in the fall to promote growth of cool season grasses, try to avoid fertilizing around trees and shrubs until after they have gone dormant (lost their leaves) and avoid fall fertilizing of perennial plants altogether. Fertilizing too early, especially with nitrogen, might trigger a late flush or growth that will predispose plants to cold weather injury.
- Avoid mulching too deeply; a 2- to 3-inch depth is ideal. Also, pull mulch away from the base of trunks; do not pile mulch around trunks as this can lead to disease problems on the trunk and rodent issues around the plants.
- Diseased or broken branches and limbs can be trimmed at any time, though they might become more noticeable after trees and shrubs lose their leaves. Leave most of the routine pruning, however, until late winter/early spring of next year.

Coleman’s barn and equipment upkeep tips include:

- Clean feed and tack rooms, stalls, and aisles thoroughly, using a broom and/or pressure washer to remove accumulated grime, cobwebs, and dust. Winter tends to be dry, so eliminate as much dust and dirt as possible in the barn.
- Pressure-wash exterior windows and the outside of barns. Touch up paint and sealants where necessary, and rake or blow leaves and debris away from building foundations.
- Sharpen and tune up chainsaws and other equipment that might be needed during winter. **UK**

*Karin Pekarchik is an editorial officer in UK’s Agricultural Communications Services.*

## **ADAMS NAMED ASSISTANT RESEARCH PROFESSOR AT GLUCK CENTER**

Amanda A. Adams, PhD, a postdoctoral scholar at the University of Kentucky Gluck Equine Research Center, accepted an assistant research professor position at the Gluck Center at the beginning of September.

The new 100% research-focused position in the research title series was created in the Department of Veterinary Science to increase its breadth in equine immunology, gerontology, and nutrition. Adams was hired for her extensive immunology experience in working with equine geriatric horses and her knowledge of nutritional science. The position will be supported entirely from extramural research funds and/or intramural endowment funds available to the

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William Robert Mills Chair in Equine Immunology.

“Dr. Adams has made significant contributions to our research program on the aged horse,” said David Horohov, PhD, William Robert Mills chair in equine immunology and professor at the Gluck Center. “Her appointment was critical to the future expansion of the Gluck Center’s research program on improving the health and well-being of the geriatric horse.”

Adams received her graduate and post-doctoral training in Horohov’s internationally acclaimed equine immunology research program at the Gluck Center. After obtaining her BS in biology, with minors in chemistry and equine business management, from Stephens College in Columbia, Mo., she completed her PhD in equine immunology at UK’s Department of Veterinary Science in August 2008

before beginning her postdoctoral scholar position.

As a PhD student, Adams’ research included:

- Characterizing age-associated changes in equine immune function, including measuring proliferation responses (*in vitro*, or in the live horse) via flow cytometry and thymidine incorporation and quantitating inflammatory cytokine production (*in vitro* and *in vivo*, or in the lab) using intracellular staining, ELISAs, and Real-Time PCR (RT-PCR).
- Identifying the “inflamm-aging” response (increased production of inflammatory mediators) in the aged horse and characterizing adiposity’s (fats deposits) effects on aged horses’ pro-inflammatory response by conducting a dietary restriction study while measuring inflammatory cytokines over time.

- Demonstrating aged horses’ humoral (in the blood) and cell-mediated responses to influenza vaccination and challenge (*in vitro* and *in vivo*). Immune responses to the virus were measured using equine influenza virus (EIV)-isotypic ELISAs, hemagglutination inhibition antibodies, EIV-induced proliferation, intracellular interferon-gamma production, Th1 and Th2 cytokine production using RT-PCR, and clinical disease responses.

As a postdoctoral scholar, Adams’ research focused on:

- Determining the effects of dietary components on age-associated changes of immune function, including responses to recall and novel vaccinations and inflammatory and antioxidant responses in the horse.
- Further characterizing aged horses’ immune response by measuring telomerase (an enzyme associated with aging) activity, investigating T-cell membrane raft components, and identifying “biomarkers” of aging.
- Studying the effects of polyphenols (resveratrol) on both immune and metabolic responses of equine metabolic syndrome-affected horses.
- Characterizing the immune response during weaning and understanding probiotic supplementation’s effect on fecal microflora and cell-mediated immunity, particularly interferon-gamma production.

“Dr. Horohov’s research program has and continues to attract considerable competitive and noncompetitive extramural support for work supporting the research to further characterize the immune system



**Dr. Amanda Adams’ research aims to improve geriatric horses’ health and well-being.**



(AMANDA ADAMS ...)

of the aged horse,” Adams said. “This research is valuable not only because of the increasing numbers and health concerns of geriatric horses in the United States and elsewhere, but also because of its comparative medical significance with respect to age-related changes in immune function in humans, namely immunosenescence and inflamm-aging.

“I am thrilled to continue my research with Dr. Horohov’s research team at the world-renowned Gluck Center and even more ecstatic knowing that I will improve the health of the geriatric and metabolic horse, and I expect to make an impact on the aging human,” Adams continued.

Adams has published 15 scientific research papers and 18 abstracts. Recent awards include the Paul Mellon Post-Doctoral Scholarship, first place presentation award at the American Association of Veterinary Immunologists meeting, Geoffrey C. Hughes Fellowship, and the Fayette County Math and Science and Technology Mentor Award.

During her undergraduate years Adams was a laboratory technician at Clean Earth Technologies LLC, at the University of Missouri’s Veterinary Biomedical department, and at Companion Animal Research & Development at Intervet Inc. She also was a biological research and development intern and a pharmaceutical research and development intern at Boehringer Ingelheim Vetmedica Inc.

For more information about the program for improving geriatric horses’ health and well-being, contact Adams at [amanda.adams@uky.edu](mailto:amanda.adams@uky.edu). [UK](#)

*Jenny Blandford is the Gluck Equine Research Foundation Coordinator at the Gluck Center.*

## STUDENT SPOTLIGHT

To highlight equine research projects by graduate and doctorate students in the University of Kentucky College of Agriculture, the Bluegrass Equine Digest newsletter features a different student’s work in each issue.



### Katheryn L. Cerny

**From: Born in Durban, South Africa, grew up in California, and has lived in Lexington, Ky., since 2004**

**Degrees: BS in Animal Science from California Polytechnic State University, San Luis Obispo**

Katheryn Cerny will complete her master’s in veterinary science at the University of Kentucky (UK) in early 2012. A native of South Africa, she chose to obtain her degree at the Gluck Equine Research Center because she wanted to work with Ed Squires, PhD, Dipl. ACT (hon.), director of the Equine Initiative and executive director of the UK Gluck Equine Research Foundation, in the reproductive health group.

While at the Gluck Center, Cerny’s thesis for her master’s was “Presence of bacteria in the reproductive tract of healthy stallions and its relation to the fertility of mares.”

“We worked with two Central Kentucky Thoroughbred farms to look at the presence of potentially pathogenic bacteria on stallions, and then we tried to see if there was a difference in pregnancy rates between stallions with negative and positive cultures. We also looked at post-breeding uterine cultures of mares to find any presence of bacteria after breeding live cover,” Cerny said.

The study is important to the equine industry because of the amount of money spent on treating mares post-breeding to reduce the effects of the potentially pathogenic bacteria. The study evaluated whether it was necessary to treat all mares post-breeding.

As a side project, Cerny also researched “Fertility of mares inseminated with frozen/thawed semen centrifuged through a single layer density gradient,” which was accepted recently as a short communication in the *Journal of Equine Veterinary Science*. Cerny will continue her education at UK in a PhD program with Phillip Bridges, PhD, in the Department of Animal Science. She will study reproductive biology in other domestic species besides the horse. [UK](#)

*Jenny Blandford is the Gluck Equine Research Foundation Coordinator at the Gluck Center.*

## Nielsen Joins Gluck Center Faculty

*Martin Nielsen, DVM, PhD, joined the University of Kentucky Gluck Equine Research Center as an assistant professor in parasitology in August. Below is an introduction from Nielsen about his research interests:*

I graduated from the Royal Veterinary and Agricultural University in Denmark in 2001 and started working as an equine veterinary practitioner in Copenhagen. After three years as a practitioner I decided to pursue an academic career and enrolled in graduate school at the University of Copenhagen.

As a veterinary student I was fascinated with parasites, so it was natural for me to choose a PhD project in equine parasitology. The PhD project brought me to the United States where I established invaluable contacts to leading scientists within my field. As a part of my training, I spent six months with Ray Kaplan, DVM, PhD, at the University of Georgia. Upon my graduation in 2007, I was hired as a junior faculty member in the University of Copenhagen's Department of Large Animal Sciences. During 2008-2010 I received a postdoctoral scholarship from the Danish Research Council, which allowed me to spend a six-month sabbatical at the Gluck Center, where I worked with Dan



**“I will take novel genomics approaches for characterizing parasite populations to provide a better understanding of anthelmintic resistance.”**

**Dr. Martin Nielsen**

Howe, PhD, and Eugene Lyons, PhD.

In my research I have focused on diagnostic methods for detecting equine helminth parasites and resistance to anthelmintic drugs. I have developed a novel real-time polymerase chain reaction (PCR) assay for diagnosing the equine bloodworm *Strongylus vulgaris*, and I have validated several existing diagnostic tools to provide

a better foundation for interpreting their results. I have studied anthelmintic resistance in the field and worked with colleagues to develop more accurate methods for classifying anthelmintic resistance on farms. Lastly, I have studied and evaluated the outcomes of different anthelmintic treatment regimens.

I am truly excited about the opportunities as a faculty member at the Gluck Center. The research in equine parasitology performed by Harold Drudge, DVM, ScD, former chair of the Department of Veterinary Science, and Lyons over the past half century is legendary, and the department possesses a high level of expertise and excellent research facilities.

My future research focus will remain on anthelmintic resistance, parasite control programs, and diagnostic methods. We now know that the traditional approaches for parasite control are not sustainable, and we need to identify alternative approaches. I will take novel genomic approaches for characterizing parasite populations to provide a better understanding of anthelmintic resistance. In addition, I intend to study the interaction between equine parasite burdens and the immune system of horses to learn whether the parasites might render horses more susceptible to viral and bacterial infection. [UK](#)

*Martin Nielsen, DVM, PhD, an assistant professor at the Gluck Equine Research Center, provided this information.*

## Gluck Center Researcher Featured Presenter in Parasite Webinar

**M**artin Nielsen, DVM, PhD, assistant professor in equine parasitology at the University of Kentucky Gluck Equine Research Center, was a presenter in a recent webinar about parasite control in horses on [TheHorse.com](http://TheHorse.com).

During the webinar Nielsen spoke and answered questions regarding why you can't and shouldn't kill all worms, how to find out if current deworming programs work, and farm management practices to improve parasite control.

Nielsen was joined in the webinar by Ray Kaplan, DVM, PhD, Dipl. ECPC, ACVM, professor of parasitology at the University of Georgia and director of the Athens Parasitology Diagnostic Laboratory, and Wendy E. Vaala, VMD, Dipl. ACVIM, Senior Equine Technical Services Specialist at Merck Animal Health.

Nielsen works on developing new and improved diagnostic methods, studying



## DRAFT HORSE FIELD DAY

**University of Kentucky (UK) College of Agriculture researchers again teamed up with Asbury University for its annual Draft Horse Field Day, held Sept. 24 at the Asbury University Equine Center in Wilmore, Ky. In addition to draft horse competitions, student demonstrations, children's activities, and the Mission Farm groundbreaking ceremony, the event featured an educational component offered by UK researchers. Topics included "What's in my pasture?" by Ray Smith, PhD, professor and forage extension specialist; "Choosing a horse feed," by Bob Coleman, PhD, PAS, associate director for undergraduate education in equine science and management and extension horse specialist; "What's bugging my horse?" by Mary Rossano, PhD, assistant professor in UK Department of Animal and Food Sciences; and "Horse and human bones," by Jamie MacLeod, VMD, PhD, John S. and Elizabeth A. Knight chair and professor of veterinary science at the Gluck Equine Research Center.**

## (PARASITE WEBINAR ...)

mechanisms of anthelmintic (de-wormer) resistance, and developing sustainable strategies for equine parasite control.

The webinar was held Oct. 25. To view the webinar, visit: [TheHorse.com](http://TheHorse.com). [UK](#)

*Jenny Blandford is the Gluck Equine Research Foundation Coordinator at the Gluck Center.*

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## UPCOMING EVENTS

### Nov. 2-6

National Horse Show sponsored by Alltech, Kentucky Horse Park, Alltech Arena, Lexington, Ky.

### Nov. 9-13

Professional Association of Therapeutic Horsemanship National Conference, Hyatt Regency, Lexington, Ky.

### Nov. 10, 6 p.m.

Kentucky Equine Networking Association (KENA) Meeting; Joel Turner, JD, with Frost Brown Todd Attorneys, will speak about "Asset Protection Planning for the Horse Owner/Horse Business Owner." Networking 6 p.m.; Dinner 6:30 p.m., Clarion Lexington-North, Lexington, Ky.

### Dec. 6, 1:30-8 p.m.

Advances in Equine Neurological Diseases Symposium presented by the University of Kentucky Gluck Equine Research Center, Embassy Suites, Lexington, Ky.