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Morris Animal Foundation Funds EAV Study at Gluck

The Morris Animal Foundation (MAF) announced Feb. 2 that it would fund \$10,800 for Gluck Center researchers to conduct a genome-wide association study of horses for susceptibility to equine arteritis virus (EAV).

EAV is the causative agent of equine viral arteritis (EVA), which is characterized by upper respiratory tract disease in adult horses, abortion in broodmares, and pneumonia in young foals.



Stallions can become long-term EAV carriers and transmit the virus to susceptible mares through natural breeding or embryo transfer.

Stallions can become long-term carriers of the virus. Chronically infected stallions can then transmit the virus to susceptible mares through natural breeding as well as embryo transfer. EVA appears to be on the rise because horses are increasingly transported nationally and internationally for breeding and competition, according to Udeni Balasuriya, BVSc, PhD, associate professor of virology at the Gluck Center.

Results of previous studies in Balasuriya's laboratory revealed that an *in vitro* (in the lab) test could be used to predict which horses are highly susceptible to EAV infection. The work in connection with the Morris Animal Foundation Grant entails testing susceptible and resistant horses with more than 54,000 genetic markers identified during the sequencing of the horse genome. Researchers will compare the distribution of markers for the two groups and use those that are unique to one group to uncover genes that play a role in viral infection or immune response.

Others involved in the study include Ernie Bailey, PhD, immunogenetics researcher and

professor at the Gluck Center; Peter Timoney, MVB, PhD, FRCVS, Frederick Van Lennep Chair in Equine Veterinary Science at the Gluck Center; and Yun Young Go, a PhD candidate at the Gluck Center. The study is part of Go's ongoing PhD program research.

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“The Morris Animal Foundation has funded this pilot project to identify the specific genes that make horses susceptible to EAV infection,” Balasuriya said. “Findings from this study would allow us to establish a strong link between host genetics and susceptibility to infectious disease agents. This is a new area of research that combines expertise in equine genetics and infectious diseases at the Gluck Center. We would like to thank MAF for supporting this important study by providing funding.

“Results of this study will enhance our

understanding of the carrier state as well as susceptibility to the disease (EVA),” Balasuriya continued. “In the long run, findings from this study will allow us to develop diagnostic tools to predict possible carrier stallions of EAV and prevent further spreading of the virus.”

Balasuriya said if the data from this pilot study suggest that susceptibility/resistance to EAV infection is indeed associated with a specific gene(s), they will also test 120 semen samples using the same techniques from this study in a separate follow-up study.

The Morris Animal Foundation (www.morrisanimalfoundation.org), which supports research to prevent, diagnose, treat, and cure disease in companion animals, horses, llamas, and wildlife, has committed to funding nearly 30 new and continuing large animal health studies in 2011. The Foundation has committed \$1.7 million toward equine health and welfare research throughout the next three years. **UK**

Jenny Blandford is the Gluck Equine Research Foundation assistant at the Gluck Center.

Horses Needed for Metabolic Syndrome and Laminitis Research

The equine genetics research group at the University of Minnesota College of Veterinary Medicine is collaborating with Ray Geor, BVSc, MVSc, PhD, Dipl. ACVIM, professor and chair of the department of large animal clinical sciences at Michigan State University, and Nicholas Frank, DVM, PhD, Dipl. ACVIM, associate professor of large animal clinical sciences at the University of Tennessee, to investigate the occurrence and genetics of equine metabolic syndrome (EMS). Bob Coleman, PhD, PAS, associate director for undergraduate education in equine science and management and extension horse specialist at the University of Kentucky, also is involved in the study.

EMS is a condition characterized by obesity and/or regional adiposity (cresty neck), elevation of blood insulin levels, and increased risk for laminitis development. Certain horses that seem predisposed to EMS often are

referred to as “easy keepers.” These horses are very efficient at utilizing calories and often require a lower plane of nutrition to maintain body weight than other horses. This difference in EMS susceptibility among horses managed under similar conditions is likely the result of a genetic predisposition.

The goal of this investigation is to better understand the role of breed, gender, age, environment (diet and exercise), and genetics in EMS. The success of the study depends on the collection of data from as many horses with EMS as possible; therefore, horse owner and veterinarian assistance is critical.

Thus far, more than 500 horse owners have provided information about their horses, which has already helped increase the research team’s understanding of EMS and laminitis. However, to meet all of the team’s research goals, they need more horse owners’ help. The researchers’ aim is to identify genetic markers that will predict a horse’s risk level for developing EMS and laminitis before clinical signs manifest, allowing owners and veterinarians to initiate management practices that better protect their horses from developing disease.

The goal of this investigation is to better understand the role of breed, gender, age, environment (diet and exercise), and genetics in EMS.

(HORSES NEEDED ...)

Study participation involves three steps:

1. Fill out a 10-question survey at www.cvm.umn.edu/equinegenetics/EMS.
2. If the horse is selected as a potential candidate, the owner will be sent a link to a second on-line survey requesting additional information regarding diet and exercise, a few simple body measurements, and photos of the horse suspected of having EMS in addition to photos of another horse on the property not suspected of having EMS to serve as a “control.”
3. Owners of horses selected for inclusion in the genetic study will be asked to work with their veterinarians to provide blood samples (that will be analyzed free of charge) including testing for insulin, glucose, ACTH, and lipids; and submit feed, hay, and pasture samples that also will be analyzed free of charge (both owners and veterinarians will receive notification of the results). A portion of the blood sample will be used for DNA isolation and stored for genetic research.

Horse owners assisting in the project will be providing information essential to further understanding EMS and ultimately determining ways to better manage and treat affected horses. To learn more about the equine metabolic research project and how you can help make a difference in the welfare of many horses, visit www.cvm.umn.edu/equinegenetics/EMS. **UK**

Bob Coleman, PhD, PAS, associate director for undergraduate education in equine science and management and extension horse specialist at the University of Kentucky, provided this information.

WEED OF THE MONTH

Common name: Musk thistle

Other names: Nodding thistle

Scientific name: *Carduus nutans L.*

Life Cycle: Biennial; sometimes annual

Origin: Eurasia

Poisonous: No

Musk thistle, also known as nodding thistle in some areas, is distributed across the United States and is listed as noxious in many states. This invasive species can reach heights of six feet and is frequently found in pastures, rangeland, and along roadsides.

The only redeeming characteristics of this plant are the showy, bright red-to-purple flowers that bloom from May to September. The light, windborne seeds can move great distances to infest adjacent areas. Seeds germinate in the fall or spring and form rosettes (circular arrangement of leaves). Generally, these plants don't begin flowering until they are 2 years old, although some act as an annual and produce seeds after a year of growth (usually in warmer climates).

Mowing must be timely to be an effective musk thistle control—mow after the stem elongates but before seed heads are produced. An effective biological control in some areas of the United States are thistlehead weevil larvae that eat the thistle's seeds. Controlling musk thistle in pastures is relatively easy with herbicides that kill the thistle but do not harm pasture grasses. Consult your local Cooperative Extension Service personnel (www.csrees.usda.gov/Extension) for a list of herbicidal controls in your area. **UK**

William W. Witt, PhD, a researcher in the department of plant and soil sciences at the University of Kentucky, provided this information.



Seedling



Rosette



Mature, flowering plant

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.

Kadie Vanderman, MS

From: Bentleyville, Pa.

Degrees: A.A., Liberal Arts, Community College of Allegheny County, 2005

B.S., Animal Sciences, Penn State University, 2007

M.S., Veterinary Science, University of Kentucky, 2011

In December 2010 Kadie Vanderman completed her master's degree under the supervision of James MacLeod, VMD, PhD, John S. and Elizabeth A. Knight chair and professor of veterinary science at the Maxwell H. Gluck Equine Research Center and director of UK's Equine Initiative. Vanderman said there were many reasons she chose to complete her masters at the Gluck Center, explaining that "it has a great reputation and amazing resources in the form of senior scientists, laboratory equipment, current technology, and a relationship with the equine industry."

During high school Vanderman was active in rodeo and spent two years competing on the professional rodeo circuit after graduation. She later chose to concentrate her graduate school studies on equine musculoskeletal science after veterinarians diagnosed her horse, Cody, with osteoarthritis.

"When I learned that osteoarthritis is an incurable, degenerative disease, I wanted to contribute to research efforts aimed at finding a cure," Vanderman said. "Dr. Jamie MacLeod is asking the kind of questions in which I was interested, and his lab offered the ideal opportunity to conduct equine cartilage biology research."

During her time at the Gluck Center her main project demonstrated that a cell surface receptor (called BOC) is expressed at high levels in articular cartilage. This receptor binds a very important class of signaling molecules called Hedgehog ligands.

"BOC was first described eight years ago, but previously had been associated only with tissue growth and cellular differentiation in developing embryos," Vanderman said. "Surprisingly, the levels we found in joint cartilage were substantially higher than every other tissue we tested, even embryonic tissues. This is really interesting, in part because the cells in articular cartilage have already completed their differentiation process and only divide infrequently." MacLeod commended Vanderman's work, which has been accepted for publication in *Osteoarthritis & Cartilage*, the official journal of the Osteoarthritis Research Society International. The research is the first description of BOC in adult articular cartilage.

Vanderman plans to pursue her doctorate degree and search for answers to important biomedical research questions as a career. She also hopes to someday teach at the college level. [UK](#)



Kadie and her horse, Cody

Jenny Blandford is the Gluck Equine Research Foundation assistant at the Gluck Center.

UK Pasture Evaluation Program Success Continues

The University of Kentucky initiated its Pasture Evaluation Program in 2005, which has since grown along with its number of participants. Sponsored by the UK Equine Initiative, the program began in response to the Mare Reproductive Loss Syndrome epidemic that swept through Central Kentucky in 2001. The program has maintained several farms as regular clients throughout the years while attracting new clients annually.



With many pastures in the state in poor condition, more farms are looking to help their pastures recover.

In 2010 UK made three significant changes to its Pasture Evaluation Program. First, the UK Veterinary Diagnostic Laboratory (formerly LDDC), under the leadership of Cynthia Gaskill, DVM, PhD, clinical veterinary toxicologist at the

UKVDL, and Lori Smith (head chemist), now offers ergovaline testing. This partnership with UKVDL provides fescue toxicology results for farms and a great network of professionals for the program and its participants to access. In 2011 work with UKVDL's toxicology department will continue and grow into a research and testing relationship.

The second change came in April 2010, when Ray Smith, PhD, forage extension specialist, announced the program would be expanded from its Central Kentucky boundaries to include the entire state. This provides outreach opportunities for those not in the area and valuable data from many regions of the state. In 2010 evaluations were performed outside of the Bluegrass region in Gallatin, Henderson, and Russell counties.

Finally, the program began testing farm-harvested bedding for tall fescue toxicity. Many farms in recent years have allowed certain fields to grow over and have then harvested the material to use for bedding. While this practice saves the farm in bedding costs, it can potentially expose broodmares to toxic levels of ergovaline, the chemical found in infected tall fescue that is responsible for early pregnancy loss, late-term abortions, foaling difficulty, and poor milk production in broodmares. Because so many factors affect ergovaline levels, including stage of maturity and drying time in bedding material,



Evaluations look at a pasture's composition.

testing is the only way to know what type of risk is associated with the material. This program is largely possible due to the support from UKVDL.

By the end of 2010, the UK Pasture Evaluation Program had conducted 91 evaluations, representing more than 14,000 acres of land. With many pastures in the state in poor condition, more farms will be looking to help their pastures recover. Extension services in general already have seen a marked increase of farms looking to them for help and support. Along with county agents and extension programs/field days, the Pasture Evaluation Program is a valuable tool to help managers and owners make better pasture management decisions.

Pasture Evaluation Program Details

Pasture evaluations take a detailed look at a pasture's composition and include grass and

(PASTURE EVALUATION ...)

weed species identification. From the information gathered by a trained technician, Smith then makes recommendations for each individual field. These recommendations are listed in a notebook that includes detailed data results from the farm, maps of fields sampled, soil information, and a host of University publications that cover all topics from grass establishment to hay quality and internal parasite control.

Pasture evaluation participants have two packages to choose from. The standard package includes tall fescue sampling to determine a percent infection and ergovaline concentration. This package is ideal for large farms and breeding operations. The small farm package is priced more conservatively and excludes tall fescue lab analysis. This package is designed for small farms or boarding facilities that do not breed mares.

After Smith completes the farm evaluation, he or program coordinator Tom Keene present a comprehensive binder containing all data, recommendations, satellite maps, and publications to the host farm.

For more information or to enroll in the Pasture Evaluation Program, visit www.uky.edu/Ag/forages/Horselinks.htm. Direct questions to Krista Cotten at 859/257-0597 or krista.cotten@uky.edu, or Tom Keene at 859/257-3144 or tom.keene@uky.edu. **UK**

Ray Smith, PhD, is a forage extension specialist at the University of Kentucky. Krista Cotten is the assistant coordinator of UK's Horse Pasture Evaluation Program.

MANAGING MUD ON HORSE FARMS

You might know the feeling when you lift your foot to take a step across your horse's paddock and suddenly realize that your boot has been left behind and your soaked foot is half a step away from it in ankle-deep mud. Mud is a problem anywhere water meets bare soil. And during the last few years Kentucky horse farms have had their share of mud.

Horses are creatures of habit and return to the same grazing areas repeatedly. This behavior leads to overgrazing and trampling that inevitably reduces grass coverage and results in muddy areas. Recent extreme weather conditions have further thinned Kentucky pastures, magnifying the mud issue. Mud is not only unattractive, it also is dangerous for horses and people to move around in, harbors bacteria, and decreases pasture productivity. However, the following pasture management practices can help reduce mud and its associated challenges.

Overseeding

Overseeding heavy traffic areas can prevent or correct mud issues. Depending on your method, overseeding can be a long-term solution or a short-term simple fix. The ideal method is to remove horses from the paddock or fence off an area, then seed into a prepared seedbed or killed sod with perennial grasses such as Kentucky bluegrass, orchardgrass, and endophyte-free tall fescue. This requires seeding equipment, sacrificing some of your turnout, and waiting six or more months for the seedlings to fully



Muddy pastures are unattractive and dangerous.

establish, but the results can last for years.

On the other hand, perennial and annual ryegrass provide horse owners with short-term overseeding options that are quick to establish and relatively inexpensive. Annual ryegrass will establish very quickly and is inexpensive; however, it only survives until midsummer. Perennial ryegrass survives for about two years in Kentucky if not overgrazed, but it is a bit more expensive and slightly slower to establish. Unlike other cool-season grasses, ryegrasses can be broadcast on top of the ground and will still germinate and take root. In small, high-traffic areas this might be the simplest mud management method. Keeping horses and people off this area as long as possible will produce the best results; consider relocating high-traffic sites such as hay racks and water tanks, or walking horses through a different gate until the roots are established. Broadcast seeding (also known as top seeding) of other forage species (Kentucky bluegrass, orchardgrass, etc.) will not be successful unless the area is dragged or cultipacked

(MANAGING MUD ...)

(to compact the soil) after seeding to bury the seed. Even when overseeding ryegrass, dragging is recommended.

Successful overseeding depends on several factors including time of seeding, seed quality, and soil fertility. Always purchase certified seed of improved varieties and consider performing a soil test before seeding. Make sure to use endophyte-free perennial ryegrass, since turf-type perennial ryegrass contains an endophyte similar to that found in tall fescue, which can cause problems for pregnant mares. Early March is the best time for spring overseeding in Kentucky.

High Traffic Area Pads

Sometimes seeding can't provide enough relief from mud. Paddocks with only one gate or water source, for instance, face mud issues constantly, especially when overstocked. In these cases owners can install high traffic area pads. These pads do require some investment; however, they will reduce or eliminate mud for years to come.

A high traffic area pad or feeding pad consists of geotextile fabric, No. 4 crushed stone, and a dense grade aggregate installed over an excavated area. The result is a pad of smooth, dry surface similar to concrete. The geotextile fabric prevents mud from seeping into the pad and eventually engulfing the area. Typically, poured concrete costs around \$4 per square foot. The University of

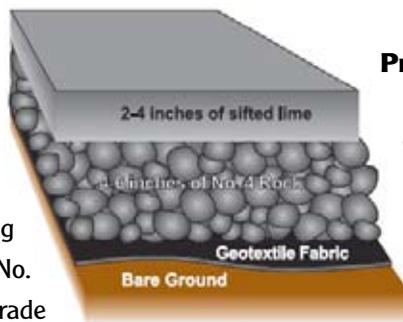


DEBORAH SIMON

Pasture rotation is a simple way to avoid mud.

Kentucky Biosystems and Agricultural Engineering Department estimated the cost of a high traffic area pad around 80 cents per square foot.

These pads can be installed anywhere that equine or machine traffic is too high to establish cover, including around gates, water/feed sources, and along fence lines or shade areas.



High traffic area pads can reduce mud for years.

Preventing Mud in the Future

Mud prevention requires long-range planning and a balance between managing horses and managing pastures. Establishing a sacrifice area is a simple way to decrease pasture damage during times of heavy moisture or excessive drought. A sacrifice area is similar to a drylot that will provide an alternative turnout space to pasture. Ideally, the sacrifice area should be prepared similarly to the high traffic pad as described above.

Pasture rotation is one of the simplest ways to avoid mud issues. By resting pastures, bare soil often will be reduced naturally. When paired with overseeding, it will provide a greater increase in cover. Pasture rotation only requires two paddocks, but three or more are recommended to provide each paddock with longer rest. [UK](#)

Ray Smith, PhD, is a forage extension specialist at the University of Kentucky. Krista Cotten is the assistant coordinator of UK's Horse Pasture Evaluation Program.

More Information

The University of Kentucky has several publications related to mud management. Please see the list of publications below for more information. These, as well as other pasture-related information, can be found at www.uky.edu/Aq/forage/Horselinks.htm. Contact your local county agriculture and natural resource agent with specific questions or issues.

High Traffic Area Pads for Horses (ID-164) Higgins, Koostra, Workman, Gallagher, and Coleman.

Maintaining Healthy Horse Pastures Teutsch (Virginia Tech) and Smith (University of Kentucky).

Establishing Horse Pastures (ID-147) Smith, Lacefield, Schwer, Witt, Coleman, and Lawrence.

KER ESTABLISHES LAWRENCE FELLOWSHIP AT UK

Kentucky Equine Research (KER) has established a graduate student fellowship at the University of Kentucky College of Agriculture to honor the memory of Larry Lawrence, PhD, who was a valued KER employee for many years.

The Lawrence Fellowship, worth more than \$25,000 per year, will fund a graduate student in a program related to applied equine sciences.

The first fellowship recipient is Catherine Whitehouse, a former KER intern who earned an equine science degree from Lincoln University in England, where she prepared a dissertation on seasonal changes in nonstructural carbohydrate accumulation in pasture grasses as related to the etiology of laminitis.

“KER looks forward to supporting the University of Kentucky’s goal of improving the health and well-being of horses through the education of graduate students at the UK College of Agriculture,” said Joe Pagan, PhD, founder and president of KER.

Whitehouse will be advised by Bob Coleman, PhD, PAS, assistant professor in the Animal and Food Sciences Department and the associate director of the Equine Initiative.

“An important goal of the ... Equine Initiative is to provide relevant programs for Kentucky’s signature industry,” said Nancy Cox, PhD, associate dean for research at UK’s College of Agriculture and administrative lead of the Equine Initiative.

“To have an important industrial partner like KER provide a fellowship of this magnitude is an expression of confidence in our programs that is much appreciated.”

Lawrence joined KER in 2002 and accepted the responsibilities of leading the company’s technical staff and providing support for the company’s stateside and international clients.

“To have an important industrial partner like KER provide a fellowship of this magnitude is an expression of confidence in our programs that is greatly appreciated.”

Nancy Cox, PhD

“I had the pleasure of knowing Larry for over 25 years,” said Pagan. “I will always remember Larry as a superb horseman, a talented nutritionist, and a friend. Larry had a rare gift that allowed him to communicate complex nutritional principles in terms that horsemen could understand. His contribution to equine nutrition and KER was substantial.”

KER is a private equine nutrition and exercise physiology research center whose goal is to advance the industry’s knowledge of equine nutrition and exercise physiology and apply this knowledge to produce healthier, more athletic horses at all stages of life. [UK](#)

Kim Brown is global marketing manager for Kentucky Equine Research.

LIKE US ON FACEBOOK

The University of Kentucky’s College of Agriculture has several equine-related Facebook pages that present the latest news and events information. Stay up-to-date with UK’s horsey happenings by following their activity on these pages:

[Equine Initiative](#): The UK Equine Initiative is an overarching framework for all things equine at the University of Kentucky, including the undergraduate degree program, equine-related student organizations, equine research, and outreach activities.



[University of Kentucky Maxwell H. Gluck Equine Research Center](#): The mission of the Gluck Center is scientific discovery, education, and dissemination of knowledge for the benefit of the health and well-being of horses.

[Kentucky Equine Networking Association](#) (created by the Kentucky Horse Council and University of Kentucky): The Kentucky Equine Networking Association’s (KENA) mission is to provide an educational and social venue for equine professionals and other horse enthusiasts from all disciplines to share ideas and business strategies and obtain current knowledge on horse and farm management with the principal objective of enhancing individual horse ownership and the horse industry at large.

(FACEBOOK ...)

Saddle Up SAFELY: Saddle Up SAFELY is a new rider safety awareness program sponsored by UK HealthCare, UK College of Agriculture, and many community organizations. It aims to make a great sport safer through education about safe riding and horse handling practices. **UK**

UK VETERINARY DIAGNOSTIC LABORATORY OFFERS NEW STRANGLES TEST

The UK Veterinary Diagnostic Laboratory, formerly the Livestock Disease Diagnostic Center, is offering a new test for the bacterium that causes equine strangles, *Streptococcus equi* subspecies *equi*, that differentiates between vaccine-related and wild-type infections.

Strangles is a highly contagious infection of the upper respiratory tract and lymph nodes. Affected horses display clinical signs such as greenish, yellow, or white “snotty” discharge, fever, loss of appetite/anorexia, depression, cough, and swellings that are a result of abscessation of the lymph nodes. More serious complications include the spread of abscesses to various sites (bastard strangles) and purpura hemorrhagica (immune-mediated inflammation).

The strangles vaccine currently available is a modified live strain (in which live microorganisms have been modified so they are not pathogenic [disease-causing] but will still cause the horse’s immune system to mount an immune response) that is quickly recognized and

eliminated by the immune system. However, vaccinated horses sometimes present with respiratory symptoms or abscesses. Test results can help owners and veterinarians determine whether the infection is vaccine-induced, or if a horse needs to be quarantined due to infection by the wild type of strangles.

The assay to differentiate between the two strains costs \$100, and results are ready in one week. For more information, contact Erdal Erol, DVM, PhD, a diagnostic microbiologist at the UKVDL, at 859/257-8283. **UK**

Cassie Allison is an equine communications intern at the UK Equine Initiative and a Community Communications and Leadership Development major.

UPCOMING EVENTS

March 1, 4 p.m.

Equine Initiative Career Fair, E. S. Good Barn

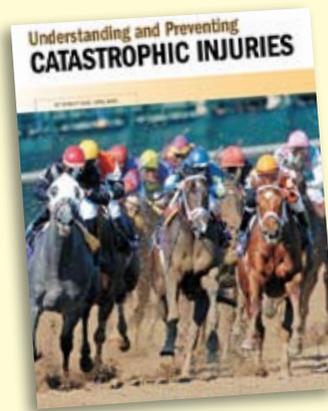
March 17, 6 p.m.

Kentucky Equine Networking Association (KENA) meeting, The Red Mile Clubhouse, Lexington

March 31, 6 p.m.

Distinguished Industry Lecture Series, Ted Bassett, author of “Ted Bassett: My Life,” Gluck Equine Research Center Auditorium

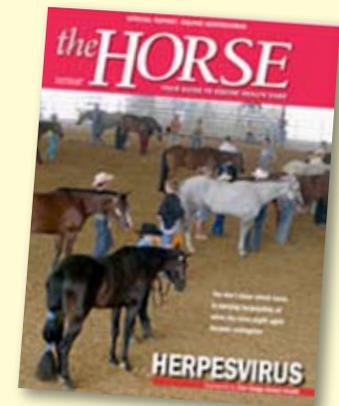
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YOUR GUIDE TO EQUINE HEALTH CARE





**HORSES ARE BUILT TO COMPETE
WITH OTHER HORSES.
NOT PARASITES.**



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Always consult your veterinarian before starting any parasite program.



Exclusive Horse Health Company of the NTRA Charities-Barbaro Memorial Fund.
To help in the search for a cure for laminitis, donate online at RidingWithBarbaro.org.



Pfizer Animal Health

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