UK Ag Equine University of Kentucky

BLUEGRASS EQUINE DIGEST

Pfizer theHORSE.com Your Guide to Equine Health Care

BROUGHT TO YOU BY THE UK EQUINE INITIATIVE AND GLUCK EQUINE RESEARCH CENTER

Second Annual Breeders' Short Course Recap

The University of Kentucky College of Agriculture partnered with the University of Minnesota to present the 2nd Annual Kentucky Breeders' Short Course, held Jan. 21 and 22 in Lexington. The first day of the course was designed for veterinarians, and the second day was for horse owners. Both days included a half-day session on equine metabolic syndrome (EMS) as part of a research project between the two schools' faculty. The following are highlights from some of the presentations:

Identifying and Managing EMS

Ray Geor, BVSc, PhD, Dipl. ACVIM, professor and chair of the Department of Large Animal Clinical Sciences at Michigan State University, presented both days to educate industry professionals about equine metabolic syndrome. EMS describes obese, insulin-resistant horses and ponies with increased susceptibility to laminitis. Breeds particularly susceptible to EMS are pony breeds, Morgans, Arabians, and Paso Finos. This condition can be controlled with restricted calorie diets and limited pasture time. Horses and ponies might remain susceptible to laminitis even after weight loss.

Toxicology Prevention in Horses

Cynthia Gaskill, DVM, PhD, clinical veterinary toxicologist at the UK Veterinary Diagnostic Laboratory, presented six steps for treating poisoned horses. They included stabilizing the patient, clinical evaluation of the patient, decontaminating the patient if appropriate, enhancing the elimination of absorbed toxin, administering an antidote if available and appropriate, and providing symptomatic and supportive care as needed. Decontamination methods include gastric lavage (flushing) and activated charcoal. Absorbed toxin elimination methods include diuresis (increased urine flow and excretion rate of renally excreted

ARTICLES OF INTEREST

Student Spotlight: Claudia Klein

Weed of the Month: Poison Ivy

Equine Disease Quarterly: Equine Abortion of Unknown Cause

Samples Needed for Wobbler Syndrome Research

Equine Disease Quarterly: Microbial Colonization of the Foal's GI Tract

CSU Lecture Series Honors Gluck's Dr. Ed Squires

Animal Genetics Testing Lab's 25th Anniversary

Upcoming Events

(BREEDERS' SHORT COURSE ...)

toxins), repeated doses of activated charcoal, ion trapping, and chelation (a process that binds a mineral to an amino acid).

Managing Carbohydrates in Equine Diets

Laurie Lawrence, PhD, a professor in the Animal and Food Sciences department at UK, discussed how to interpret the nutrient content of equine feed. Horse owners often have their feed analyzed for nutrient content in order to assure maximal nutritional value for their animals.

Emergent and Re-Emergent Diseases

Peter Timoney, MVB, MS, PhD, FRCVS, Frederick Van Lennep Chair in Equine Veterinary Science at UK's Gluck Equine Research Center, spoke about emergent and re-emergent diseases currently affecting the equine industry. Current emerging infectious diseases include Potomac horse fever, acute equine respiratory syndrome, and mare reproductive loss syndrome. Current re-emerging infectious diseases include equine herpesvirus myeloencephalopathy and Venezuelan equine encephalomyelitis.

Diseases of the Scrotum and Testis in the Stallion

Barry Ball, DVM, PhD, Dipl. ACT, Albert G. Clay Endowed Chair in Equine Reproduction at UK's Gluck Equine Research Center, presented on various scrotal and testicular diseases at Veterinarian's Day. One of the main topics of discussion was cryptorchidism—the failure of one or both testes to descend properly into the scrotum. This is a relatively common condition affecting 2-8% of male horses. Cryptorchidism appears to be related to a reduction of an insulin-like peptide and reduced testosterone levels and/

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 will feature a different student's work in each upcoming issue.

Claudia Klein, DrMedVet, PhD, Dipl. ACT, ECAR

From: Germany

Degrees:

Justus-Liebig-University: Veterinary School 2004
Ludwig-Maximillians-University: DrMedVet 2006
Diplomate American College of Theriogenology: 2009
Diplomate European College of Animal Reproduction: 2009
University of Kentucky, Department of Veterinary Science, PhD: 2010

Claudia Klein started her PhD at the University of Florida in Gainesville under the guidance of Mats Troedsson, DVM, PhD, Dipl. ACT, ECAR. When Troedsson accepted the position of the director of the Gluck Equine Research Center and chair of the Department of Veterinary Science at the University of Kentucky in 2007, Klein transferred to UK to continue graduate studies under his supervision.

While at the Gluck Center, Klein's main projects focused on reproduction studies—in particular, early pregnancy, which was the focus of her dissertation. Klein also was involved with a study on the impact of antibiotics in semen extenders on the transmission of contagious equine metritis during artificial insemination.

Klein completed her PhD in December 2010. She will continue her research at the Gluck Center and her emphasis on early pregnancy in horses. However, she hopes to expand her research to include late pregnancy with an emphasis on pregnancy loss due to placentitis (inflammation of the placenta). UK

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

(BREEDERS' SHORT COURSE ...)

or receptors. The undescended testis associated with cryptorchidism is subjected to elevated temperature, which causes problems in the differentiation between germ (genetically programmed to become eggs) and somatic (any body cell other than an egg or sperm cell) cells.

Equine Dental Care

Jack Easley, DVM, MS, Dipl. ABVP, a private practitioner, gave a presentation at the Horse Owners' Day on equine dental care. All horses should receive a yearly dental exam, Easley said, which is sometimes referred to as floating. This might involve filing the teeth to balance the mouth. Some clues that horses might be having dental problems include loss of feed from the mouth, lugging on the bridle, head tilting or tossing, resisting the bit, large undigested food particles in manure, loss of body condition, and facial swelling.

Other short course speakers included Molly McCue, DVM, PhD, Dipl. ACVIM, University of Minnesota; Ed Squires, PhD, Dipl. ACT (Hon.), UK Gluck Equine Research Center; Krishona Martinson, PhD, University of Minnesota; Dan Rosenberg, Rosenberg Thoroughbred Consulting; Tim Capps, University of Louisville Equine Business Program; and Mats Troedsson, DVM, PhD, Dipl. ACT, ECAR, UK Gluck Equine Research Center. UK

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

WEED OF THE MONTH

Common name: Eastern Poison Ivy
Scientific name: *Toxicodendron radicans* (L.) Kuntze
Life Cycle: Perennial
Origin: North America
Poisonous: Severe skin irritant to sensitive humans

Eastern Poison Ivy

Eastern poison ivy inhabits much of the eastern United States. It is a woody perennial that can grow as a low shrub, trailing vine, or climbing vine. As a climbing vine it can grow several yards high and often reaches into the tops of trees. It grows in a wide range of habitats such as pastures, fence rows, and forest edges.

Poison ivy roots are fibrous and grow from a taproot (the main root that grows vertically downward) and long subterranean rhizomes (rootstocks). Aerial roots on vines are frequently noticeable. The vines are woody and light brown or grayish. The easiest identifying characteristic is a trifoliate (having three leaves) compound leaf with shiny leaflets that can be 2 to 4 inches in length and are pointed at the tip. Leaves turn a bright red or reddish-yellow in the fall, and the plant produces greenish to grayish-white berries in late summer to early fall. Reproduction is by seeds, rootstocks, and stems that root when they come into contact with the soil. Berries are spread by birds.

All parts of the poison ivy plant, both live and dead, contain urushiol oil and can cause acute dermatitis (inflammation of the skin) to humans sensitive to the oil. Fumes from burning poison ivy plants might also transmit the oil. Animals such as cats, dogs, and horses are not sensitive to poison ivy, but can transfer the oil to humans.

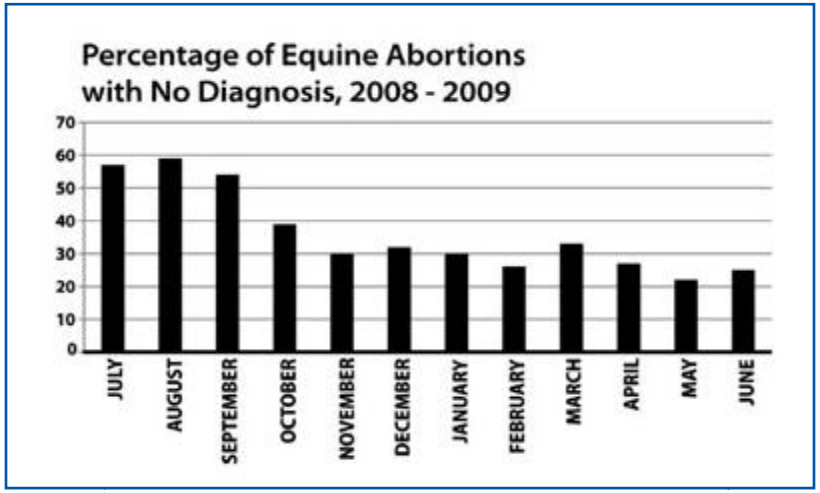
Poison ivy plants in pastures usually grow low to the ground, and mowing is not an effective control tactic. Cutting the vines and removing plants from fences or trees also does not offer long-term control since the poison ivy plant will regrow from root buds or rhizomes. The most effective control is by herbicidal sprays. Several herbicide products are available for poison ivy control. Consult your local Cooperative Extension Service personnel (www.csrees.usda.gov/Extension) for herbicidal control in your area. UK

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

Equine Abortion of Unknown Cause

Pregnancy loss is relatively common in horses. Only 80% of mares bred give birth to a live foal at term. The loss of the developing foal (fetus) during gestation can fall under one of two categories: early embryonic loss, in which the loss of a fetus occurs in the early stages of pregnancy (generally less than 40 days of gestation); and abortion—a loss later in gestation. Determining the cause of early fetal loss is very difficult, and in many instances the aborted fetus is reabsorbed or lost. The probability of determining the cause of an abortion later in gestation is greater, but many still go undiagnosed.

One research study revealed that 1,308 fetuses or fetuses and placentas were submitted to the University of Kentucky Veterinary Diagnostic Laboratory over a two-year period encompassing the 2008 and 2009 foaling seasons. Full-term fetuses that died from birth-related trauma, dystocia (difficult birth), or asphyxia (lack of oxygen) were excluded from the study, leaving a total of 921 aborted fetuses. The most common diagnosis category was abortion due to an infectious cause, with 301 cases, or 33%. Of these, the more common diagnoses were placentitis (inflammation of the placenta), with 174 cases (19% of overall total), bacterial abortion/septicemia (48 cases, 5%), and viral abortion (25 cases, 3%). The most common noninfectious cause was umbilical cord torsion (126 cases, 14%). However, in 289 cases (31%) no cause for the abortion was found. The highest percentage of nondiagnosed abortions occurred from July to October, when the fetuses were typically of younger gestational age (Figure 1). As the fetuses aged and approached their due dates, the likelihood of a diagnosis increased.



Abortion cases of undetermined cause can be frustrating to the owner/manager, veterinarian, and pathologist. These cases can be referred to as idiopathic abortions, no diagnosis, or abortions of undetermined etiology. While these diagnoses are not a welcome sign on a report, all is not lost. It simply means there is no explanation for the abortion by examination and testing of the fetus. A positive outcome is that an infectious disease was not found in the fetus or membranes. Diagnostic laboratories are adept at diagnosing infections of the fetus/membranes, and if pathogens are not found, the likelihood of an infectious abortion is low. Since infectious agents are often those that can result in multiple abortions or "abortion storms" in a herd, this determination allows the farm owner and staff to rest easier.

Likewise, a number of other common causes of abortion can be excluded through routine testing and pathology. Therefore, even if the etiology of the abortion is not found, many significant diseases and conditions can be ruled out. Often the pathologist also will note additional information about the case that can be helpful. When no fetal reason for the abortion is found, other possible explanations are considered. In addition to undetected genetic components or as yet unknown fetal factors, maternal problems should be considered, including those of genetic, metabolic, anatomic, endocrinologic, immunologic, and microbiologic origin. Horse breeders generally recognize the importance of diagnostic testing on all abortions, but they should also realize that in a significant number of cases a precise cause of abortion might not be found by examination of the fetus and placental membranes. UK

For more information, contact Dr. Neil Williams, nmwillia@uky.edu, Veterinary Diagnostic Laboratory, University of Kentucky, Lexington.

Reprinted with permission from the Equine Disease Quarterly, *University of Kentucky, Department of Veterinary Science.*

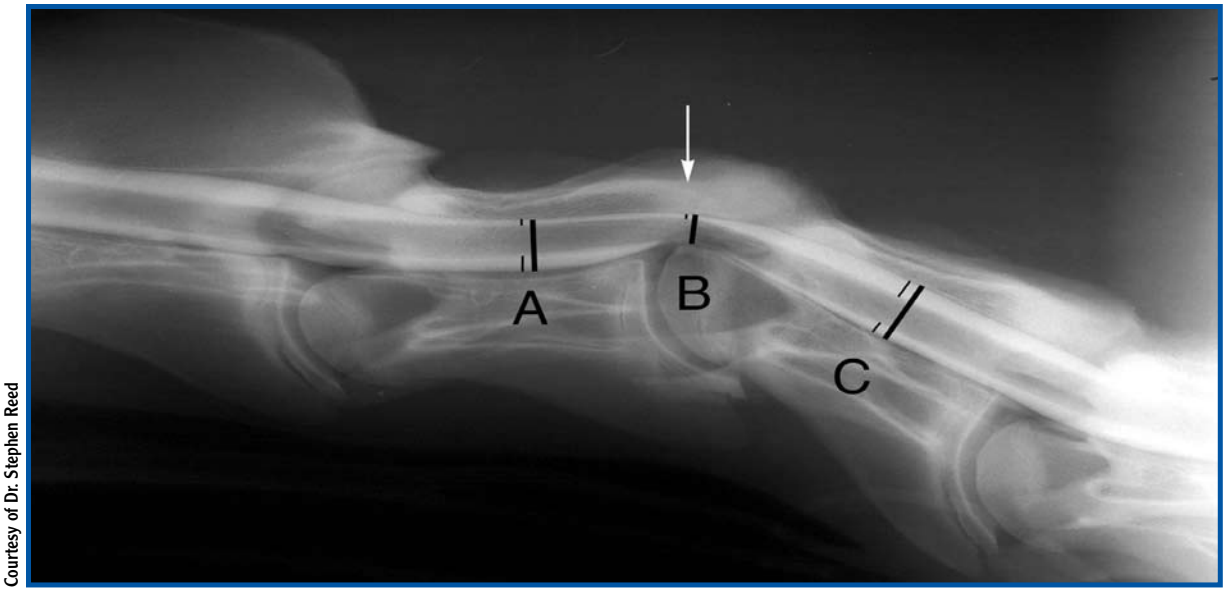
Samples Needed for Wobbler Syndrome Research

On a warm spring night, everyone in the barn is eagerly awaiting a new foal's arrival. The wait is rewarded with the birth of a big, strong, and beautiful colt. Over the next 12 months the foal thrives. The owners dream of having a future champion until one morning the farm manager notices the colt's gait is abnormal, and he looks somewhat incoordinated (ataxic) in his hindquarters. The veterinarian comes to the farm, examines the yearling, and takes standing radiographs (X rays) of the cervical vertebrae. Assessment of the radiographs and the clinical signs lead to a diagnosis of wobbler syndrome and a guarded prognosis for any sort of successful athletic career.

This scenario is one that occurs all too often but, with participation from the equine community, University of Kentucky researchers hope to learn more about the genetics behind the disease.

Wobbler syndrome affects the horse's nervous and musculoskeletal systems. It is characterized by a structural narrowing of the vertebral canal in the neck that can produce severe neurologic deficits through cervical spinal cord compression. The cause is thought to be multifactorial with genetics, high planes of nutrition, trauma, rapid growth, and decreased copper/increased zinc levels all potentially playing a role.

The possible role of genetics, in particular, is interesting and remains somewhat controversial. A pedigree analysis several decades ago suggested that inherited genes were involved, yet breeding studies have not demonstrated a clear pattern of inheritance. Do genetic determinants exist? Is a single gene or multiple genes involved? Are there interactions between genetic and environmental (management) variables? Perhaps more relevant in the immediate term, however, is whether there is any hope that we will be able to answer these questions and elucidate the role of genetics in this disease?



Courtesy of Dr. Stephen Reed

The letter B on this myelogram indicates the site of narrowing in the neck.

The answer to the last question is "yes"—there is now a new reason to be hopeful. With completion of the equine genome sequencing project and the subsequent development of a genetic research tool based on analyzing a type of DNA variation known as single nucleotide polymorphisms (or SNPs), researchers can study genetic associations in the horse with much greater sensitivity than was previously possible. Two University of Kentucky veterinarians at the Gluck Equine Research Center—Jennifer Janes, DVM, PhD, and James MacLeod, VMD, PhD, John S. and Elizabeth A. Knight chair, professor of veterinary science and director of UK's Equine Initiative—are currently conducting an SNP-based research study to pinpoint genes that might contribute to the cause and progression of wobbler syndrome.

However, assistance from the horse community is critical to identifying additional cases. If you know of a horse with wobbler syndrome and would like to contribute to the study, contact Janes by e-mail at jennifer.janes@uky.edu. UK

Microbial Colonization of the Foal's GI Tract

The gastrointestinal (GI) tract of the normal adult horse contains a complex community of microorganisms. Most of these microbes are located in the large intestine, where they assist in food digestion (especially fiber) and synthesize compounds (such as some vitamins) that are important to the horse's health. Most of the helpful microbes in the gut of the normal horse are nonpathogenic, and they are typically called the normal flora. Some pathogenic organisms also reside in the GI tract, but these organisms are kept in check because they have to compete with the normal flora.

In foals, the colonization of the GI tract by pathogenic organisms can lead to diarrhea. Considerable research has focused on identifying the organisms responsible for neonatal diarrhea, but less effort has been made to identify the factors that allow the pathogenic organisms to become established. Additionally, very little is known about how or when the normal GI flora becomes established in the foal.

Researchers at the University of Kentucky have been studying the development of digestive capacity in foals for several years. An initial project indicated that very young foals have a low capacity for fiber digestion but older foals have a capacity similar to their dams. Because fiber digestion is performed by specific bacteria in the large intestine, these observations suggest that foals develop normal microbial populations in their GI tracts by at least 1 or 2 months of age.

In the past, study of the GI flora has been limited by the availability of accurate, economical, and relatively time-efficient laboratory methods. New molecular techniques are now being developed that will facilitate the study of the equine flora and hopefully enhance researchers' knowledge of this important part of equine health. For instance, researchers at UK have recently used an analysis called denaturing-gradient-gel-electrophoresis (DGGE) to compare the similarity between the fecal flora of neonatal foals and their dams from birth through about 12 weeks of age.

Because most of the microbial population of the horse's GI tract resides in the large intestine, feces are an accepted and noninvasive substitute for actual large intestinal contents. With DGGE, researchers isolate microbial metagenomic DNA from the feces and amplify it by polymerase chain reaction (PCR). The resulting amplicons (pieces of DNA formed via PCR) are then separated on a gradient gel to produce a banding pattern that represents the diversity of the microbial community. The number and placement of the bands are distinctive to the community sampled.

On the first day after foaling, researchers observed that the similarity between the microbial DNA in mare feces and foal feces was low. However, the similarity rapidly increased, and by 2 weeks of age foals appeared to have similar microbial populations in their feces compared to the mares' populations. None of the foals in this study suffered from pathogenic diarrhea, so these observations suggest that the foal's gastrointestinal tract is colonized by normal microbes within a few days of birth.

Several questions remain in UK's study of the colonization of the foal's GI tract. It is unknown whether a failure of the normal flora to colonize the gastrointestinal tract increases the foal's susceptibility to pathogenic diarrhea. If so, strategies

Prebiotics and Probiotics

Prebiotics and probiotics are used for a similar purpose: to optimize the microbial community of the gastrointestinal tract. However, they have different mechanisms of action.

A prebiotic is a substance that provides nutrients to specific and desirable microbes in the digestive tract. Common prebiotics are various types of fermentable compounds (usually carbohydrates). The goal of a prebiotic is to stimulate the growth of beneficial organisms that already inhabit the gastrointestinal tract, particularly the large intestine.

A probiotic contains live organisms, such as *Lactobacillus* or other microbes. Its goal is to introduce beneficial organisms to the gastrointestinal tract. To be effective, the probiotic organisms must be alive at ingestion and must be able to live in the gastrointestinal tract.

(MICROBIAL COLONIZATION ...)

to enhance normal flora development might be beneficial to the foal. The research group examined the effect of a prebiotic on the incidence of diarrhea in foals in a two-year study. In the first year, prebiotics use tended to decrease the number of days foals were treated for diarrhea. However, in the second year there was a low incidence of diarrhea in both treatment groups (control and prebiotic-treated), and, therefore, researchers noted no significant effect of the prebiotic.

In the future researchers hope to study the effects of both prebiotics and probiotics on foals' GI flora development. In addition, they would like to identify the normal progression of microbes that colonize the foal's gastrointestinal tract in the first few days of life. UK

For more information, contact Laurie Lawrence, PhD, llawrenc@uky.edu, Department of Animal and Food Sciences; or Michael Flythe, PhD, Michael.flythe@ars.usda.gov, Research Microbiologist, USDA-ARS, University of Kentucky, Lexington.

Reprinted with permission from the Equine Disease Quarterly, *University of Kentucky, Department of Veterinary Science.*

CSU Lecture Series Honors Dr. Squires

Dr. Ed Squires

Two years ago, Colorado State University (CSU) created a lecture series titled the "Ed Squires Lecture in Equine Reproduction" in honor of Ed Squires, MS, PhD, Dipl. ACT (hon.), executive director of the University of Kentucky Gluck Equine Research Foundation and director of advancement and industry relations.

Squires was a faculty member at CSU for 33 years before joining the faculty at UK in November 2008. The series is funded by the late Neil Chur and his wife, Barbara Chur, owners of Strawberry Banks Farm, a prominent Arabian farm in East Aurora, N.Y. The Churs donated the money to CSU to have an outside speaker lecture on equine reproduction. Tod Hansen, PhD, director of CSU's Animal Reproduction and Biotechnology Laboratory came up with the idea to name the series after Squires.

"The intent is to have a venue where you have a state-of-the-art lecture on equine reproduction once a year," Squires said. "It's a very nice honor of Colorado State University to have named a series in my honor."

Squires gave the first lecture in the series in 2009 at the Equine Science Society meeting in Keystone, Colo. The first invited speaker for the series was Cornell University's Doug Antczak, VMD, PhD, in November 2010. The lecture was held at CSU's Animal Reproduction and Biotechnology Laboratory.

CSU has invited Squires to recommend speakers for the annual series and to attend each lecture. The next lecture is slated for fall 2011. UK

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

ANIMAL GENETICS TESTING LAB'S 25TH ANNIVERSARY

This year the University of Kentucky's Animal Genetics Testing & Research Laboratory (AGTRL) will celebrate 25 years of offering a variety of genetic testing services to horse owners and breed registries.

Established in 1986 and formerly known as the Parentage Testing Laboratory, the AGTRL is located in the Gluck Equine Research Center after being housed in the Dimmock Animal Pathology building at UK until 2009. Available genetic tests include traditional blood typing, DNA typing, parentage analysis, and color gene testing. The lab further provides an opportunity for horse owners to investigate their horses' DNA and offers a range of tests to the public.

The AGTRL, under the leadership of director Kathy Graves, PhD, is one of three animal genetics laboratories associated with public universities in the U.S. The other two are located at the University of California, Davis, and Texas A&M University.

The AGTRL was in development before DNA tests were even widely used. The Department of Veterinary Science had begun regularly conducting blood type testing to verify parentage for Standardbred registrations across the country when scientists became aware of a condition occurring in about 2% of Standardbreds called neonatal isoerythrolysis (which occurs in healthy foals and results in a conflict between the foal and the antibodies found in its mother's milk, which causes a destruction of the foal's red blood cells).

(AGTRL ...)

DNA technology became available around 1994 and, as it became more frequently used, replaced blood typing for parentage analysis. DNA became easier for owners to sample and for labs to test, and genetic markers were established as comparisons to verify parentage or identification.

With the ease of sampling came the development of more tests for genetic diseases such as junctional epidermolysis bullosa (also known as JEB, which can affect Saddlebreds) and overo lethal white syndrome (OLWS, a concern in Paint horses). The test for JEB was developed at the AGTRL.

Other tests available at the AGTRL can determine the presence of genes linked to coat color such as the *e locus* gene, which controls presence of red or black hair; the Agouti gene, which determines whether a horse is bay or black; the cream dilution gene, responsible for palominos and buckskins; champagne dilution; silver; gray; sabino; and tobiano. The champagne dilution, tobiano, and sabino tests were also developed at the Gluck Center in the laboratory of Ernie Bailey, PhD, professor in the Department of Veterinary Science.

The AGTRL uses its revenue for genetic research projects and works with breed registries to identify genetic issues within specific breeds. To request a series of tests, owners, breeders, and veterinarians can visit the AGTRL website at www.ca.uky.edu/gluck/AGTRL.asp.

Jenny Blandford is the Gluck Equine Research Foundation assistant at the Gluck Center. Natalie Voss, a former UK equine communications intern, contributed to this article.

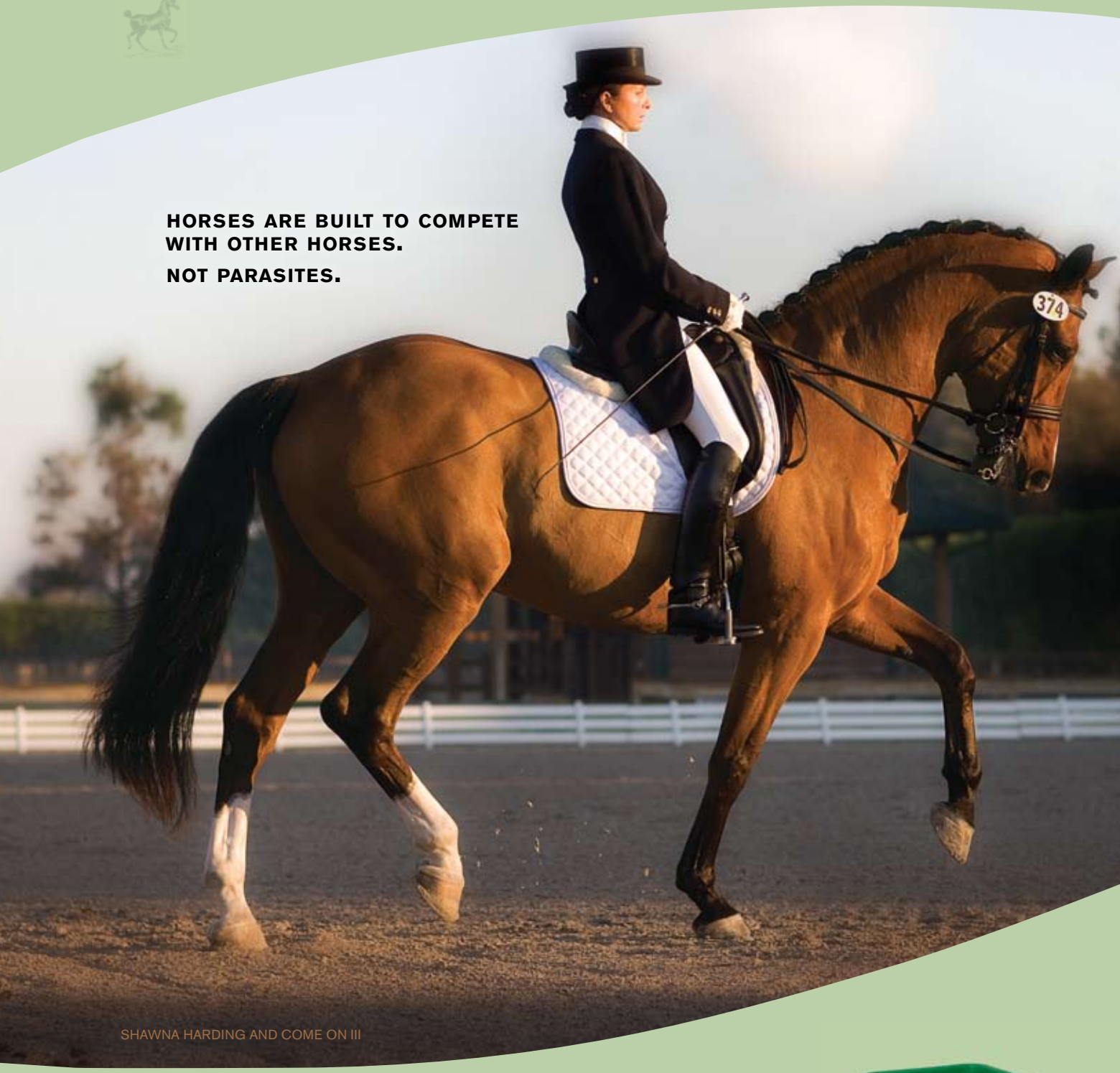
UPCOMING EVENTS

February 1, 4 p.m.
Pastures Please educational meeting, Scott County Extension Office

February 17-19
American Saddlebred Convention & Youth Conference, Griffin Gate Marriott, Lexington

February 24, 4 p.m.
Department of Veterinary Science Equine Diagnostic and Research Seminar Series; Dennis Brooks, DVM, PhD, Dipl. ACVO, professor at the University of Florida, will speak about equine ophthalmology. Location: Kentucky Horse Park, South Theater in the Visitor's Center

March 17, 6 p.m.
Kentucky Equine Networking Association (KENA) meeting, Holiday Inn North, Lexington



SHAWNA HARDING AND COME ON III

Parasites compete with your horse for nutrition. Left unchecked, they can impair condition, performance and even cause colic. The solution? Deworm daily with STRONGID® C 2X *(pyrantel tartrate)*, which doesn't allow parasites to get a foothold and can make a visible difference in your horse. To learn more, visit StrongidC2X.com.

Always consult your veterinarian before starting any parasite program.

Strongid® C 2X

For your everyday champion.

BARBARO

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