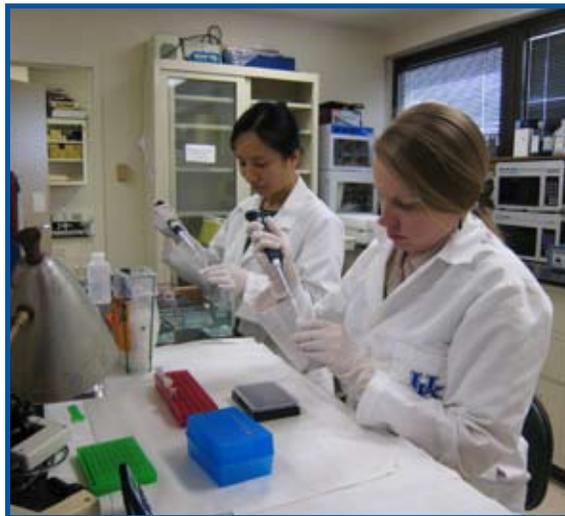


BROUGHT TO YOU BY THE UK EQUINE INITIATIVE AND GLUCK EQUINE RESEARCH CENTER

Equine Herpesvirus Research Ongoing at the UK Gluck Center

The recent spread of a neurologic form of equine herpesvirus type 1 (EHV-1), believed to have originated at a cutting horse show in Ogden, Utah, held April 29 to May 8, and subsequent outbreaks of the disease across the western United States and Canada highlight the importance of equine infectious disease research.

The University of Kentucky Department of Veterinary Science has a long and illustrious history of equine herpesvirus research. The late William



Yanqui Li and Kathryn Smith work on PCR tests in Udeni Balasuriya's laboratory.

Dimock, DVM, and Philip Edwards, PhD, first investigated the etiology of abortion storms on many Central Kentucky breeding farms in the 1920s (before the disease was known as EHV-1). Today the Gluck Equine Research Center continues to conduct research on the virus.

A significant number of EHV-1 outbreaks also have been reported this year in Europe, with some affected horses exhibiting respiratory and neurologic signs. In addition, there have been reports of sporadic cases of EHV-1 abortions and occasional cases of infection in neonatal foals, according to Peter Timoney, MVB, FRCVS, PhD, Frederick Van Lennep Chair in Equine Veterinary Science, and Udeni Balasuriya, BVSc, PhD, virology professor at the Gluck Center.

“The development of neurological disease in particular horses may be influenced by a variety of virus, host, and environmental factors,” Balasuriya said. “More basic research is needed to understand the molecular basis of the neurologic form of equine herpesvirus-1 infection. There should be more collaborative research between scientists who are working on EHV-1 around the world.”

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In 1993 the Office International des Epizooties (the animal equivalent of the World Health Organization) designated the Gluck Center as a World Reference Center for three of the important equine viral diseases, including equine rhinopneumonitis (equine herpesvirus-1 and -4). Former Veterinary Science faculty member Roger Doll, DVM, PhD, and others were responsible for determining a great deal of what is known today about EHV-1 and the virus' clinical signs. They devised laboratory procedures to study EHV-1 infections, including vaccine development and evaluation. The late George Allen, PhD, a former Gluck Center professor, was one of the world's leading authorities on equine herpesvirus diseases. In collaboration with researchers at the Animal Health Trust in Newmarket, United Kingdom, he identified virus strains of a particular genotype (genetic code) associated with neurologic disease outbreaks.

Several equine herpesvirus research projects are currently under way at the Gluck Center, including "Molecular characterization of neurovirulent EHV-1 strains," a two-year study that began last year and is funded by the Grayson-Jockey Club Research Foundation. Balasuriya is the principle investigator and is collaborating with Timoney and Frank Cook, PhD, associate research professor at the Gluck Center.

The study will attempt to identify possible additional neurovirulence (capacity to cause disease of the nervous system) determinants of EHV-1 by sequencing genes essential for replication

from a panel of archived virus isolates. It will also attempt to increase understanding of how neuropathogenic strains emerge in nature. The goal is to develop improved diagnostics, a vaccine that is effective in protecting against this disease, and more accurate predictors of the clinical outcomes associated with horses infected with particular viral genotypes.

"We are one of the few laboratories that continues to attempt isolation of the virus from clinical specimens. It is important to isolate EHV-1 strains for evaluation of their respective biological and molecular properties."

Dr. Udeni Balasuriya

Over the past decade there has been an unexpected increase in equine herpesvirus neurologic disease (equine herpesvirus myeloencephalopathy [EHM]) incidence. Previous research by other scientists suggests a significant percentage of EHM or paralytic herpes outbreaks are caused by a mutant strain. A single mutation has been identified in the gene encoding of the viral replication enzyme, which seems to confer the power of enhanced pathogenicity (a pathogen's ability to cause disease in an organism) or neurovirulence to such strains.

"It is uncertain whether there are other genotypes of the virus with similar pathogenic potential," Timoney said.

"In my opinion there may be other mutations in the viral genome that may be associated with neurologic disease, and this warrants further investigation," Balasuriya added. "EHV-1 is a very complex virus and like all known mammalian herpesvirus, can give rise to lifelong latent carrier state in horses (no evidence of virus replication or shedding, and the horse appears normal). Laboratory diagnosis of latent infection in horses is a considerable challenge."

Balasuriya said some of the major questions to be addressed through his research include:

- Does the single mutation in the viral gene involved in replication alone precipitate neurologic disease? Are there additional nucleotide changes in the viral gene involved in replication or perhaps other viral genes that may contribute to the development of neurologic disease?
- What are the major genetic determinants of EHV-1 neurovirulence?
- Is there a correlation between other equine herpesvirus infections (for example, EHV-2 and EHV-5) and EHV-1 disease outbreaks?
- How do we improve the sensitivity and specificity and overall reliability of current molecular diagnostic assays for EHV-1?

To help answer these questions, other current equine herpesvirus research at the Gluck Center includes:

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- Molecular epidemiology and evolution of EHV-1.
- Identification of virulence determinants of EHV-1 and characterization of the molecular mechanisms of EHV-1 pathogenesis and host immune response to the virus.
- Development of improved diagnostic assays and vaccines against EHV-1.
- Comparison of *in vitro* (in the laboratory) antiviral activity of herpesvirus DNA polymerase inhibitors against neuropathogenic and non-neuropathogenic strains of EHV-1.
- Investigation into equine herpesviruses' role in respiratory disease outbreaks on horse farms.

“In my opinion it is important to isolate viruses from EHV-1 outbreaks for further molecular characterization,” Balasuriya said. “We are one of the few laboratories that continues to attempt isolation of the virus from clinical specimens. It is important to isolate EHV-1 strains for evaluation of their respective biological and molecular properties. We have also developed an attenuated strain(s) of EHV-1 as a possible modified live virus vaccine(s) candidate, but have not tested these cell culture adapted strain(s) in horses.”

The Gluck Center has not yet received any clinical samples from the most recent EHM outbreaks. However, Balasuriya said he expects to receive samples from the University of California, Davis, by the end of May. [UK](#)

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

WEED OF THE MONTH

Common name: Star-of-Bethlehem

Scientific name: *Ornithogalum umbellatum L.*

Life Cycle: Perennial

Origin: Eurasia

Poisonous: Yes, all parts, especially bulbs and flowers

Star-of-Bethlehem is a cool-season perennial of the lily family. It is native to Europe, but it escaped cultivation there. The weed now grows in the eastern half of the United States and portions of the Pacific Northwest. Star-of-Bethlehem grows well in pastures, landscape beds, gardens, fields, and roadsides.

Star-of-Bethlehem grows 10 to 20 inches tall in most pastures and is generally not noted until it reaches maturity. Leaves are narrow with a pale green-to-whitish stripe near the mid-rib. Flowers are showy, with six white petals sporting a noticeable greenish stripe down the middle of the back. Flowering occurs from April to May. The plant dies back to the bulb shortly after flowering. Seeds are small, and seedling plants are rare in North America. Reproduction occurs from bulbs, which grow in clumps and are subtended with a fibrous root system.

Star-of-Bethlehem contains cardiotoxins and glycosides that are toxic to horses. The entire plant contains these toxins, but the bulbs and flowers contain the highest concentrations.

Controlling Star-of-Bethlehem is difficult. Few, if any, pasture herbicides are effective on large, maturing plants. Extremely low mowing (two inches or less) will reduce flower production, but is not effective in killing the plant since it reproduces from bulbs. Paddocks with severe infestations might need to be renovated by killing all vegetation and then seeding grasses. Small patches can be removed by hand or by digging the bulbs. Consult your local Cooperative Extension Service (www.csrees.usda.gov/Extension) personnel for control methods 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.



Star-of-Bethlehem

UK Veterinary Diagnostic Laboratory Expansion Complete

In 2008 the University of Kentucky Veterinary Diagnostic Laboratory (UKVDL) broke ground on a \$28.5 million expansion and renovation. Now the state-of-the-art project is complete, and the lab is better equipped to serve Kentucky's animal agriculture industries.

"This new facility finally puts us in a position where we can take our diagnostic testing services to the next level for Kentucky animal

agriculture," said Craig Carter, DVM, PhD, Dipl. ACVPM, director of the UKVDL. "We thank our legislature, industry stakeholders, and the College of Agriculture administration, especially Dean Scott Smith and Associate Dean Nancy Cox, for their vision and incredible support of our program."

The UKVDL is a full-service animal health diagnostic facility. Its faculty and staff handle

one of the largest caseloads in the nation, seeing 60,000 clinical cases and performing an average of 4,000 necropsies each year. The laboratory also protects public health by diagnosing many zoonotic diseases that can potentially infect people.

Prior to the renovations, the lab had one of the smallest necropsy floors in the United States. Now, at 3,000 square feet, it's one of the largest.

"The expansion of the work space was a critical need for all operations, particularly for replacing the cramped necropsy space, and also for maintaining biosecurity for infectious agents," said Nancy Cox, PhD, associate dean for research in UK's College of Agriculture, Kentucky Agricultural Experiment Station director, and administrative leader for UK's Equine Initiative. "The facilities allow for maximum efficiency of operations and also have allowed more opportunities for collaboration with fellow state agencies and veterinary stakeholders."

Facility improvements include the addition of wings for necropsy laboratories and administration, which freed up much of the existing building to increase overall laboratory space. These expansions nearly doubled the size of the previous 38,000-square-foot facility.

The center also switched to alkaline digestion as its main form of tissue disposal, which is more cost-effective and environmentally friendly than other methods. UKVDL is the only lab in



UK COLLEGE OF AGRICULTURE

Three years after breaking ground on a \$28.5-million expansion, the UKVDL project is complete.

UKVDL EXPANSION ...)

the world with two 10,000-pound digesters, which operate at only a quarter of the cost of incinerators. These and other technological improvements allow the facility to meet current biosafety requirements.

Planning for the project began in 2003 under the leadership of Cox and former lab director Lenn Harrison. Stakeholders began looking at other diagnostic laboratories across the country and made plans for improvements. The university received \$8.5 million for the project from the 2005 state legislative session and an additional \$20 million from the 2008 legislature.

Kentucky's first lady Jane Beshear made remarks at the UKVDL's ribbon cutting:

"With national accreditation and state-of-the-art technology, the Veterinary Diagnostic Lab will have a far-reaching impact that will attract national attention," she said. "The Governor and I are delighted that Kentucky Agricultural Development funds have assisted in the renovation and expansion of this groundbreaking facility, which will be a tremendous resource in protecting animal health."

Cox said the facility strives to be one of the premiere veterinary diagnostic laboratories in

the United States, providing the very best and most timely services in support of the practicing veterinary profession, Kentucky animal agriculture, the signature equine industries, companion animals, and public health.

The lab's primary goal is to develop, apply, and utilize state-of-the-art technology and scientific knowledge to improve animal health and marketability, preserve the human-animal bond, and help protect public health. **UK**

Aimee Nielson and Katie Pratt are agricultural communications specialists within UK's College of Agriculture.

New Antibiotic Susceptibility Method Available Through UKVDL

The University of Kentucky Veterinary Diagnostic Laboratory (UKVDL) recently announced the availability of a new antibiotic susceptibility method (the Broth Microdilution Method, for determining if bacteria are susceptible to an antimicrobial drug), which provides reproducible test results with minimum inhibitory concentration (MIC) levels (the lowest concentration of an antimicrobial that will inhibit visible growth of a microorganism after overnight incubation).

The American Association of Veterinary Laboratory Diagnosticians and the Clinical and Laboratory Standards Institute both endorse this state-of-the-art method. Broth Microdilution Method (or MIC method) includes a broader and updated number of antimicrobials for equine, companion animals, food animals, and poultry. For example, the equine panel includes the drugs amikacin, ampicillin, azithromycin, cefazolin, ceftazidime, ceftiofur, chloramphenicol, clarithromycin, doxycycline, enrofloxacin, erythromycin, gentamicin, imipenem, oxacillin + 2% NaCl, penicillin, rifampin, tetracycline, ticarcillin, ticarcillin/clavulanic acid, and trimethoprim/ sulfamethoxazole.

This method also can determine antimicrobial susceptibility patterns for nocardioform and other slow-growing bacteria, some fungi (yeasts), and some anaerobic bacteria that cannot be assessed by other methods (i.e., Kirby-Bauer disk diffusion). The MIC method will be the default for every bacterial isolate recovered from clinical specimens unless the practitioner indicates otherwise. Initial pricing for UKVDL's antibiotic sensitivity testing is as follows:

- Companion animal, \$12/isolate
- Food animal (including poultry), \$6/isolate
- Mastitis, \$6/isolate
- Horse, \$9/isolate
- Nocardioform, \$20/isolate
- Fungal, \$35/isolate

Necropsy cases are still capped and won't be affected by these new test fees. Clients are asked to send specimens in leak-proof containers with enough chill packs to keep them cool and to indicate culture and susceptibility on the submission forms. **UK**

Erdal Erol, DVM, PhD, head of diagnostic microbiology at the UKVDL, provided this information.

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 feature a different student's work in each issue.

Rose Burns McGee



From: Longwood, Fla.

Degrees and institute where received:

AA — General Studies, Florida College

BS — Biology, University of Tampa

Rose McGee is scheduled to complete her master's degree in the Department of Veterinary Science at the University of Kentucky this summer.

A Florida native, McGee came to the Gluck Equine Research Center to conduct genetic and cytogenetic research with Teri Lear, PhD, and Ernie Bailey, PhD. McGee was introduced to Bailey by her professor at the University of Tampa, Rebecca Bellone, PhD, who also received her degree at the Gluck Center in 2001.

"I had always been fascinated with genetics in my undergraduate studies, but I didn't seek out many research opportunities then," McGee said. "I wanted to experience work in a research environment and to learn multiple lab techniques while helping to answer interesting questions regarding equine health."

McGee's main research focus has been on disorders of sexual development in horses.

"Dr. Lear and I have been investigating clinical cases to ascertain possible causes or mechanisms for why abnormal sexual development occurred in these horses," McGee said. "Specifically, I have been examining the Y chromosomes of horses that look like females but are genetically males (they have an X and Y chromosome) to ascertain what deletions and mechanisms are responsible for the disorder."

She also worked on a pilot genome-wide association study on parasite resistance in foals as a side project at the Gluck Center. McGee will continue her education by seeking a master's degree in genetic counseling at the University of Pittsburgh's Department of Human Genetics. 

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

NITROGEN LOSSES IN SOIL DURING WET WEATHER

The steady flow of wet weather in April has caused many Bluegrass farm managers to worry about nitrogen losses in their fields, especially those where they applied nitrogen prior to the rains. Fortunately, nitrogen losses might not be as bad as many producers expect, said Lloyd Murdock, PhD, extension soils specialist with the University of Kentucky College of Agriculture.

"Producers always expect high nitrogen losses during extremely wet conditions," Murdock said. "In most cases, they aren't going to have the losses that they anticipated. Not knowing this could cause them to spend an excessive amount of money on additional fertilizers."

Producers who farm areas that flood annually, such as along the Mississippi and Ohio rivers, typically haven't applied nitrogen yet. But those who farm along creeks and secondary rivers, however, might have already applied nitrogen. These smaller tributaries could be submerged for some time due to recent major flooding of the larger rivers.

The main cause of nitrogen loss in wet soils is denitrification. This occurs when bacteria convert the nitrate nitrogen in the soil into nitrogen gas. Denitrification is triggered when the soil remains saturated for two to three days. Thus, poorly drained, low-lying areas are the most susceptible. During denitrification an average of 3 to 4% of nitrate nitrogen is lost per

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day for each day of saturation.

Fertilizers are comprised of varying rates of nitrate nitrogen. One variable in determining the amount of nitrate nitrogen in the soil is the length of time between the fertilizer application and the time of the soil saturation. Over longer periods of time ammonia, ammonium, and urea are converted to nitrate. Murdock developed a chart to help producers determine how much nitrate nitrogen is in their soil. That chart, along with sample calculations, is available online at <http://graincrops.blogspot.com/2011/04/estimating-nitrogen-losses-from-wet.html>.

Soil testing specifically for nitrate nitrogen levels is another way to determine the amount of nitrate nitrogen in the soil. Producers should ensure soil samples are a foot deep. They will also need to take soil samples of low-lying and upland areas for comparisons. Soil test results lower than 11 parts per million (ppm) mean the soil has insufficient nitrate nitrogen. Producers in this situation will likely want to side-dress nitrogen at a rate of 100 to 150 pounds of nitrogen per acre. If the soil test is between 11 and 25 ppm, producers will want to side-dress at a reduced rate—up to 100 pounds of nitrogen per

acre, with the lower soil test numbers receiving the higher application rates. If the test reveals a number greater than 25 ppm, sufficient nitrogen exists in the soil and side-dressing is not needed.

Nitrogen losses will likely be less in well-drained, upland areas that have experienced heavy rainfall. Heavy rainfall results in quicker runoff, which means less water infiltrates the soil and less nutrient removal occurs. **UK**

Katie Pratt is an agricultural communications specialist within UK's College of Agriculture.

AQHF Funds Gluck Center Research Projects

The American Quarter Horse Foundation (AQHF) will fund two equine research projects at the University of Kentucky Gluck Equine Research Center in 2011-2012. The projects are “Identifying the Role of a ‘Metabolic Master Switch’ in Equine Metabolic Syndrome and its Implications for Targeted Treatment,” Amanda Adams, PhD, a postdoctoral scholar at the Gluck Center; and “Equine Herpesvirus-1 and the Type-I Interferon Response,” Thomas Chambers, PhD, professor of veterinary virology at the Gluck Center, and David Horohov, PhD, William Robert Mills chair and professor at the Gluck Center.

The AQHF awarded Adams the Young Investigator Award, with a grant amount of \$19,547. Her study will focus on equine metabolic syndrome (EMS), a complex disease that affects Quarter Horses as well as many other breeds and typically manifests itself with increased regional and general fat deposits, systemic inflammation, insulin resistance, and a predisposition toward developing laminitis.

The study's goal is to activate the “metabolic master switch” enzyme SIRT1

with resveratrol to increase insulin sensitivity and decrease inflammation and fat deposition. This will be the first study to determine if an alternative treatment (SIRT1-activator, resveratrol) that mimics dietary restriction by modulating both inflammation and metabolic parameters will aid in treating EMS.

The AQHF awarded Chambers and Horohov \$37,236 for their study, which aims to determine if EHV-1—one of the most common viral diseases of horses worldwide causing respiratory disease, abortion, and neurologic disease—has the ability to block the horse's Type-1 interferon (INF) response, which is a front-line defense against viral diseases. Chambers and Horohov will first test whether EHV-1 infection affects the induction of Type-1 INF when stimulated by chemicals that could lead to the development of effective antiviral drugs.

These two projects were among nine equine research programs funded by the AQHF. Since 1960 the American Quarter Horse Association and AQHF have awarded more than \$8.2 million in research grants to colleges and universities across the country. **UK**

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

TOXIN TOPIC LANDSCAPING PLANTS TO AVOID

With gardening season upon us, many people are thinking about landscaping their homes and farms. Often, landscape plant choices are based on aesthetics and hardiness. However, with horses in the mix, plant toxicity is perhaps a more important aspect to consider. Even if owners plant trees, shrubs, and flowers well out of pastured or stalled horses' reach, the animals could still be exposed. Strong winds, storms, and flooding, for instance, can carry branches and other plant materials into pastures. Horses also can escape from confinement and gain access to areas normally out of reach. Garden workers might discard plant trimmings in pastures, unaware of how toxic some can be. Additionally, many farms have resident dogs and cats, so companion animal exposure must also be considered.

Below are some landscape plants to avoid planting on horse farms if possible. Give this list to landscape architects and gardeners before starting landscaping projects. For those farms with established landscapes, compare the below information to a list of existing plants to determine if removal or replacement of any plants are warranted. Consult with your veterinarian or a veterinary toxicologist experienced with horse poisoning for more information on the risks associated with various garden plants and trees.

Trees to avoid on horse farms include red and other maples, wild cherry, black walnut, black locust, oak, Kentucky coffee tree, buckeye, golden chain tree, mimosa, persimmon, chinaberry, tung nut, and cycad palms.

Shrubs to avoid include Japanese or other yew (*Taxus*) bushes, privet, common box, elderberry, Carolina allspice, choke cherry, serviceberry, buckthorn, fetterbush, laurel, and day-blooming Jessamine. *Taxus* bushes are especially toxic and ingestion of their discarded hedge trimmings is a common cause of death in horses.

Flowering garden plants to avoid include Delphinium, lily of the valley,

foxglove, rhododendron and azaleas, lobelia, sweet pea, castor beans, bulbs such as autumn crocus, lilies, iris, hyacinth, amaryllis, daffodils, poppies, morning glory, bleeding hearts, pieris, lantana, lobelia, ground cherry, angel's trumpet, periwinkle, monkshood, harebell, hibiscus, clematis, star-of-Bethlehem (see Weed of the Month on page 3), bracken fern, rosary pea, baneberry, pheasant's eye, Lords and Ladies, begonia, butterfly weed and other showy

milkweeds, yesterday today and tomorrow, caladium, diffenbachia and philodendron species, moonflower and other *Datura* species, sesbania, honeysuckle, may apple, and blue indigo.

Vegetable and crop plants can also be toxic to horses and other animals. Garden crop plants that can be toxic include onions, chives, garlic, shallots, rhubarb, turnips, potatoes and tomatoes (leaves and green fruits), tobacco, and avocados. Fence crop gardens to prevent animal access.

Many **weeds** are toxic to horses and other animals and can pose a risk to horses if discarded into pastures. Some mulches also can pose risks to animals; avoid black walnut and cocoa hull mulches in particular. Additionally, discuss toxic plant exposure risks with neighboring property owners so they do not unintentionally poison your horses by discarding garden trimmings into your pastures.

This list is not all-inclusive and does not include important toxic plants that are not typically grown in the Bluegrass region (such as oleander). As with other toxicants, intoxication depends on exposure dosage. Consult with your veterinarian or a veterinary toxicologist to determine if your garden plant choices could pose

a risk to horses or other animals. **UK**

Cynthia Gaskill, DVM, PhD, clinical veterinary toxicologist at the University of Kentucky Veterinary Diagnostic Laboratory, provided this information. Contact information: phone 859/257-7912; e-mail cynthia.gaskill@uky.edu



Azalea



Yew

WET WEATHER STIRS UP INSECTS

As rain continues across the state, insects might find their way into people's water-logged backyards, homes, and landscapes.

"There are insects and their relatives that thrive under most any set of conditions; this spring belongs to the 'water bugs,'" said Lee Townsend, PhD, University of Kentucky College of Agriculture entomologist.



Some of the biggest wet-weather nuisances are floodwater mosquitoes. These mosquitoes lay eggs in low-lying areas and wait for spring rains. Adults emerge around two weeks after a heavy rainfall—ready to eat. They might travel as far as 10 miles away from their hatching site in search of food.

Two of the most common species are the floodwater and the inland floodwater mosquitos.

The inland floodwater mosquito is a significant pest in Western Kentucky that can spawn several generations each year. The mosquito is most active in the early evening, at dusk, or just after dark, from late spring through summer. It has an irritating, painful bite.

"Fortunately, except for dog heartworm, they are not significant disease carriers," Townsend said.

Avoid mosquitoes by staying indoors when

Grayson-Jockey Club Foundation Continues Wobbler Syndrome Project Support

One of the 17 projects the Grayson-Jockey Club Research Foundation will fund in 2011 includes the continuation of a study at the Gluck Equine Research Center now in its second year.

The research project, "Orthopedic and Genetic Roles in Wobbler Syndrome," is led by James MacLeod, VMD, PhD, John S. and Elizabeth A. Knight chair and professor of veterinary science at the Gluck Center.

Equine cervical stenosis, commonly known as wobbler syndrome, is a structural narrowing of the spinal canal in the neck that produces severe neurologic deficits through spinal cord compression. Wobbler syndrome is a devastating disease targeting horses' musculoskeletal and neurologic systems. It is a distressing disease for owners of affected horses with limited treatment options. Multiple factors are thought to contribute to disease development, including genetics, high planes of nutrition, trauma, rapid growth, and altered copper/zinc levels. The exact cause and development are not well understood.

The focus of this project is to examine the role of abnormal bone and cartilage formation in the neck vertebrae and to identify regions of DNA and, potentially, event-specific genes that are involved in wobbler syndrome. The goal is to enhance the existing understanding of wobbler syndrome's cause and progression and lead to improved management and therapeutic practices.

For more information on recent equine-related grants at the College of Agriculture, visit TheHorse.com/14710. UK

the insects are most active, wearing light-colored, long-sleeved clothing, and using insect repellent.

Wet weather also brings several arthropods indoors including clover mites, springtails, and ants.

Only 0.03 inches long, clover mites look like moving dark spots to the naked eye. They will not harm people or pets but are considered nuisances because they often are found in large numbers and leave a red-brown stain when crushed.

The grass-eating mites are always present in lawns, but thrive during cool, wet springs or in excessively fertilized turf. They will crawl up outside walls and enter homes around doors or windows.

If found indoors, wipe the mites up with a soapy rag or wet sponge being careful not to crush the mites and cause stains. The crevice tool of a vacuum is also useful in mite removal.

Outdoor preventive measures include keeping turf trimmed and avoiding overfertilizing.

(INSECTS ...)

Like the clover mites, springtails can be numerous in humid or moist areas around homes and landscapes. They typically enter homes at the foundation, doorways, or at basement or crawlspace openings.

Springtails will die in dry air. Thus, if they are persistent in a home, there's likely excess humidity or moisture present. A key to controlling springtails is to reduce the humidity or moisture in your home by improving air circulation. A dehumidifier or air conditioner might help.

Another common wet weather home invader is the pavement ant. These ants often build their nests along building foundations, concrete slabs, or sidewalks and enter homes through cracks or

Avoid mosquitoes by staying indoors when the insects are most active, wearing light-colored, long-sleeved clothing, and using insect repellent.

openings. The ants have an indiscriminate palate, eating everything from dead insects to greasy foods to pet food. Often they'll form a trail from their colonies to their food sources. To effectively control the ants, homeowners should locate and directly treat their mound-shaped nests. Over time, ant traps will destroy the whole colony. Homeowners also can treat an infestation by

applying insecticide directly to the nest.

In addition, it is common for cane fly larvae to appear in landscapes in the spring. These larvae resemble cutworms but have no legs or distinct head. The larvae feed on decaying organic matter in wet, shady areas. During excessively wet periods they come out of the shaded areas and become visible on sidewalks or driveways. Neither the larvae nor adults, which resemble mosquitoes, are harmful, but large numbers of these could indicate that an area is constantly wet or has too much organic matter, which could lead to other problems. **UK**

Katie Pratt is an agricultural communications specialist within UK's College of Agriculture.

Quiz Tests Equestrians' Rider Safety

Are you aware of the potential accidents that could happen if you're not well-versed in the safety rules of riding? You can now test your knowledge before getting back on a horse by taking the simple 12-question Safety Quiz available on the Saddle Up Safely website (<http://ukhealthcare.uky.edu/saddleup/>).

The Safety Quiz comes on the heels of a national survey conducted in September 2010 by Saddle Up Safely, a rider safety awareness coalition of 40 community organizations led by the University of Kentucky (UK) College of Agriculture's Equine Initiative and UK HealthCare, which revealed that most riders don't get enough safety training or rate their safety knowledge low.

"Our study and a number of others showed that many injuries can be prevented or reduced in severity by practicing safe horsemanship," said Fernanda Camargo, DVM, PhD, equine extension professor within UK's College of Agriculture.

The most common horseback riding injuries are fractures, bruises and

abrasions, sprains and strains, internal injuries, and concussions. Injuries are most often caused by falling off a horse, but people can also be kicked, stepped on, or fallen on by horses.

Julia Martin, MD, associate professor in the Department of Emergency Medicine at the UK College of Medicine, said the most severely injured riders are seen at UK HealthCare's Chandler Hospital.

"If there was one recommended behavior we would like to see, it would be for every equestrian, whether novice or experienced, young or old, to wear an approved, correctly fitting helmet," she said.

Saddle Up Safely is one of a number of organizations including the Certified Horsemanship Association and 4H Clubs that are trying to make the sport of horse riding safer. To learn more about what you can do to improve your horse riding safety knowledge, go to saddleupsafely.org or call 859/323-5508. **UK**

Ann Blackford is a public relations specialist for the University of Kentucky.



Best Management Practices for Environmental Systems

Heavy rains throughout April and early May in Kentucky have caused excessive runoff and erosion of fields and paths. Ponding water, heavy runoff, and saturated fields can reveal how water flows on a particular piece of land—valuable information that illustrates how water systems and drainage actually work, field-by-field. This evidence can help owners take the necessary steps after heavy rains to prevent further soil loss, erosion, forage loss, pasture damage, and waterway contamination.

“While the ground is wet, take a hard look at feeding sites, gate openings, and other heavy use areas, fence rows, compost piles, and waste disposal/dispersal to ensure that best management practices are working on your farm,” said Stephen Higgins, PhD, director of environmental compliance for the Agricultural Experiment Station, Bioenvironmental Engineering, at the University of Kentucky (UK).

To strengthen a farm’s environmental systems, Higgins says horse farm managers should consider the following:

Water Quality Plan This plan is a tool used by farm owners to identify and implement best management practices on their land. “Any farm of 10 acres or

more needs a Kentucky ag water quality plan, because it became law in 1994,” said Amanda Abnee Gumbert, extension water quality liaison, UK Cooperative Extension Service. “Answering simple yes and no questions will generate a list

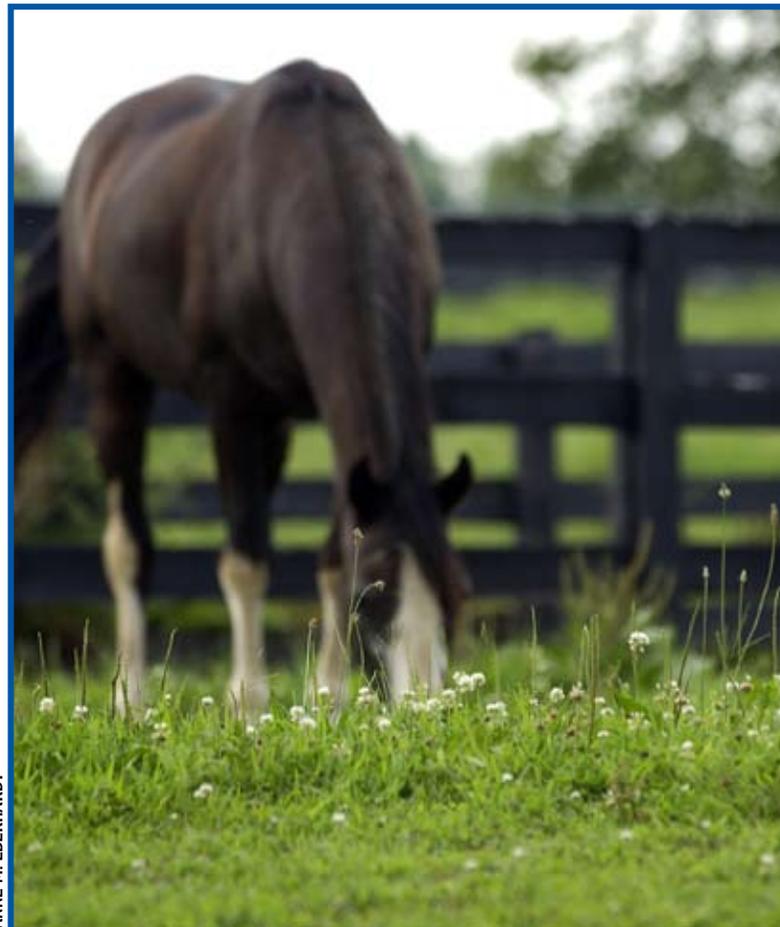
of best management practices to follow to protect water quality. A self-certification sheet should be kept on file at the local conservation district office as proof that a plan exists. Farmers do not need to turn in their plans, but should keep them as working documents.”

In Kentucky a fine of \$25,000 per offense, per day can be levied for water pollution. A tool that assists with the self-certification process is available at www.ca.uky.edu/awqa.

Proper Muck Management Muck, a combination of horse manure, urine, and bedding (usually shavings or straw), should not be used as fill for ditches, sinkholes, or gullies, which could convey dirty water into waterways. “Get rid of muck by giving it away to neighbors or garden clubs, or by composting it properly to create a humus that can be spread back on pastures,” Higgins said.

Additional nitrogen might be necessary to create enough heat to properly break down muck, which can have a high carbon content depending on its removal method and the type of bedding used. Higgins said managers can add high-nitrogen chicken and/or cattle manure to compost to balance the carbon-nitrogen ratio.

High Traffic Areas Protect high use areas with specially built traffic



ANNE M. EBERHARDT

Rotational grazing is just one management step owners can take to strengthen a farm’s environmental systems.

(MANAGEMENT PRACTICES ...)

pads designed to reduce soil compaction, erosion, and mud. Many farms use a form of stone (gravel) and geotextile fabric, but horse operations often use a combination of rock and rock dust or “crusher fines.” Feed horses in a drylot adjacent to multiple paddocks to avoid tearing up pastures, or feed in multiple areas, changing the location frequently so soil does not erode or become compacted by constant use.

Rotational Grazing Fence large pastures into smaller areas to create more paddocks. Then rotate horses through these paddocks, allowing unused fields time for regrowth. Design paddocks to exclude horses from natural drainage, rather than simply fencing off neat square areas. Remove horses when grass is grazed down to three inches to prevent overgrazing, which promotes the establishment of weeds and undesirable vegetation.

Feeding Feed horses using movable structures and above-ground hay racks.

“Elevate hay and grain feeders and move them occasionally to reduce wear and tear around them,” Higgins recommended. “Typically, 50% of hay is wasted when it is fed on the ground, so this is a cost-savings practice. Take soil samples in pastures and in feed areas to manage nutrient levels.”

Keep Clean Water Clean Drain roof water and clean headwaters away from buildings to keep them from becoming contaminated with sediment, manure, and pathogens. Collect roof water in rain barrels for secondary use, or

channel water away from building foundations into nonsensitive grassy areas.

Landscaping Plant trees that have generous canopies to create shade. Plant windbreaks (such

as trees, shrubs, etc. that will block the wind) on a mound (e.g., a hill or a natural or artificial rise of land) to protect horses from winter winds.

Enhance Riparian Areas Riparian areas are

UK EQUINE INITIATIVE FARM AND FACILITIES EXPO

The University of Kentucky (UK) Equine Initiative will host an Equine Farm and Facilities Expo on June 7, from 3:30 to 8 p.m. EDT at Shawhan Place in Paris. The expo will highlight area businesses’ displays of equine equipment and supplies. Admission is free and a meal will be provided.

“The expo will allow horse owners and horse farm managers to see the range of equipment and supplies that are currently available for horse farms of all sizes,” said Ray Smith, PhD, professor and forage extension specialist at the University of Kentucky. “UK specialists will provide hands-on instruction techniques for designing facilities, conducting strategic deworming, and spraying, seeding, and mowing pastures.”

Glenn Mackie, Bourbon County Extension agent for agriculture and natural resources, said host farm Shawhan Place is an ideal venue to demonstrate the practical aspects of management and machinery for equine operations.

“Shawhan Place is a working, medium-sized equine operation that has been developed from raw farmland,” he said.

Shawhan Place is a premier Thoroughbred farm offering foaling, breeding, sales prep and consignment, breaking, layups, and pre-training services. It is owned and operated by Theodore Kuster, Charles Koch, and Matthew Koch.

Reservations for the Equine Farm and Facilities Expo are appreciated but not required. Contact the UK Equine Initiative office at 859/257-2226 or e-mail equineinitiative@uky.edu to reserve a spot.

For more information about this and other UK Equine Initiative events, visit www.ca.uky.edu/equine or e-mail equineinitiative@uky.edu. For more information about pasture management events, visit www.uky.edu/Ag/Forage. **UK**

Holly Wiemers, MS, is communications director for UK’s Equine Initiative.

“The expo will allow horse owners and horse farm managers to see the range of equipment and supplies that are currently available for horse farms of all sizes ...”

Ray Smith, PhD

(MANAGEMENT PRACTICES ...)

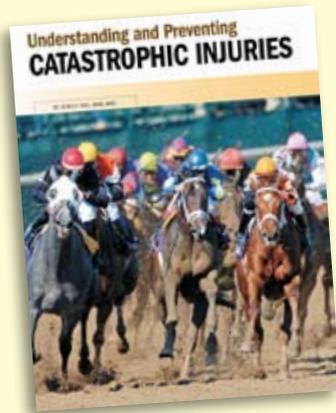
thin strips of grassy, weedy, noncrop land that border creeks, streams, and rivers and provide a transition between field or crop and waterway. Enhance riparian sections by using vegetation

to control erosion. The best practice is to create “wild and woolly” areas—untamed and natural spaces—to filter runoff before it hits surface water. Because of their proximity to water, riparian

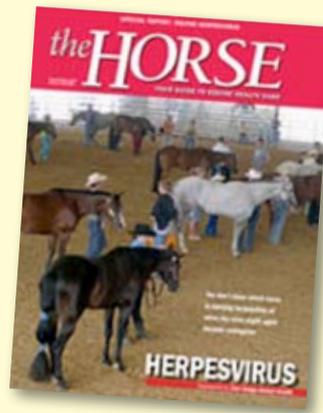
areas slow run-off, help prevent contamination, and support plant and animal diversity. **UK**

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

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UPCOMING EVENTS

June 1

2011 Kentucky Agricultural Development Fund Forum, Somerset, Ky. (See http://agpolicy.ky.gov/planning/documents/kadf-forum_schedule.pdf for the complete schedule.)

June 7, 3:30-8 p.m.

3rd Annual Equine Farm and Facilities Expo, Shawhan Place, Paris, Ky.

June 7

2011 Kentucky Agricultural Development Fund Forum, West Liberty, Ky.

June 14

2011 Kentucky Agricultural Development Fund Forum, Bowling Green, Ky.

June 15

2011 Kentucky Agricultural Development Fund Forum, Elizabethtown, Ky.

June 21

2011 Kentucky Agricultural Development Fund Forum, Gilbertsville, Ky.

June 22

2011 Kentucky Agricultural Development Fund Forum, Owensboro, Ky.

June 30, 4 p.m.

Veterinary Science Equine Diagnostic Research Seminar Series, Veterinary Diagnostic Laboratory; Erdal Erol, DVM, MSc, PhD, UKVDL head of diagnostic microbiology, will speak about diagnostic tests for bacteria and viruses.



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