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Bluegrass Equine DIGEST

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Weather's Impact on Pasture Weeds: What Should We Expect in 2014?

Pasture managers are generally concerned about the amount of forage their fields produce and whether there will be adequate rainfall to support forage crops.

Since 2007, rainfall amounts varied considerably in Kentucky. In 2007, 2008, 2010, and 2012, rainfall was below normal during the peak forage production months of April through September. Forage and hay production was lower during these years, and the impact on weeds was dramatic. The drought was severe enough in some regions that few weeds grew or produced their normal seed numbers. However, some weedy species such as common ragweed did produce near-normal seed numbers, and we noticed greater problems with this weed in the years since then. Johnsongrass is another species that has thrived over the past few years, and I believe it was the result of the very hot, dry years of 2007 and 2008 when this species also produced near normal seed production. These dry years resulted in stand losses—in some cases very severe—and some pastures that were not renovated continue to decline in quality.

However, 2013 rainfall was several inches above normal throughout most of Kentucky, and many pastures contained high weed populations as a result. Common ragweed and johnsongrass were among the most troublesome. With the wet 2013 growing season and the cold temperatures in January and early February 2014, many questions are being asked about what weeds might appear this year.

Any discussion about weed emergence must begin with an understanding of these pasture plants we call "weeds." Whether native or nonnative, these plants grow only where they are supposed to grow—in an ecological niche that allows them to germinate, emerge, grow, and reproduce before a human activity prevents seed production. Adaptive characteristics of weeds generally include the following:

- Long-lived seeds;
- Seeds that might mature after plants are uprooted or mowed;
- Those weeds that mature in synchrony with pasture management will produce seeds or vegetative organs (i.e., seed production before mowing); and
- Some weeds have a disagreeable odor or taste and are not eaten by animals.

It is important to remember that pasture grass greatly influences the number of weeds that emerge there. A thick, rapidly growing grass stand can suppress almost all weed emergence and growth; conversely, poor grass stands allow weeds to germinate and thrive.

Plants native to North America are

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Clockwise, from top left: deadnettle, poison hemlock, and henbit are three pasture weeds horse owners can expect to see return to their fields this year.

Articles of Interest

Weather's Impact

likely to be the least damaged by drastic changes in soil temperature and rainfall because they evolved to thrive under Kentucky's climate. Examples of such plants include common ragweed, cocklebur, common chickweed, spiny pigweed, tall ironweed, and nimblewill, which are frequent problems in pastures. However, non-native plants such as johnsongrass, common bermudagrass, musk thistle, poison hemlock, and purple deadnettle, are also problematic in horse pastures. These weeds have the adaptive characteristics that allow them to thrive in horse pastures.

Soil temperatures at or slightly below freezing do not reduce seed viability of the weeds mentioned above. Of the non-native weeds, johnsongrass and common bermudagrass are the two that can reproduce from vegetative propagules in addition to seeds. Johnsongrass produces underground stems called rhizomes, and bermudagrass produces above-ground stems called stolons. Soil temperatures below 15°F for a few days can kill these vegetative tissues and prevent them from growing. Most of the johnsongrass rhizomes occur in the top four inches of the soil, and the temperatures at this depth must reach and maintain 15°F for a few days. Because bermudagrass stolons develop on the soil surface, the impact of cold temperatures, especially the 0-10°F experienced in January and February of this year, can potentially kill stolon viability.

But how might the 2014 cold temperatures impact johnsongrass or bermudagrass? Probably not much, based on soil temperatures at a four-inch depth under sod. The coldest soil temperature reported in Mayfield, Covington, and Lexington, Ky., this year was 31°F and occurred on Jan. 31 and Feb. 1. These temperatures will likely not impact johnsongrass. Soil surface temperature more closely mimics air temperature and could impact bermudagrass stolon viability. Covington and Lexington reported temperatures below 15°F from Jan. 15- 30, and Mayfield reported similar temperatures, except for Jan. 25 and 26. Based on these data, there is a greater likelihood of common bermudagrass being killed compared to johnsongrass. Snow cover insulates the soil, which could mitigate winter's impact on bermudagrass stolons.

So what weeds can you expect in pastures in 2014? The same ones that occurred in previous years will likely grow and thrive this year as well. Poison hemlock, musk thistle, common chickweed, henbit, and purple deadnettle appear normal and undamaged from the recent cold temperatures.

A frequent question pertains to controlling these weeds. There is not one, simple answer for all species. First, determine if there is a need for removing the weeds. A poisonous plant such as poison hemlock is controlled by hand-weeding, mowing at a proper time, or applying herbicides in late fall or early spring.

Regardless of the method, do not allow animals to graze dying or decaying hemlock plants. Hand weeding and removal of the plants from the pasture is the safest method. Thistles generally are too numerous to hand-weed and require herbicides to control. For most weeds, mowing is not an effective control technique. Mowing might prevent seed production of some weeds; however, to kill many weeds, the mower must cut at about two inches or lower, which also reduces grass production.

Consult your local Cooperative Extension Service personnel for the best control tactic in your area. UK

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

UK Research: Fescue Toxicosis in Nonpregnant Horses

Tall fescue (*Lolium arundinaceum*) is a perennial grass adapted to much of the eastern half of the United States and widespread in the Central Ohio Valley, including Kentucky. Much of the tall fescue contains a fungus, called an endophyte, which, together with the fescue plant, produces chemicals called ergot alkaloids that can be harmful to grazing animals. The best-known of these ergot alkaloids is ergovaline.

Fescue toxicosis in horses is most frequently associated with hormonal changes in late gestation mares, causing gestation lengths to extend beyond expected due dates. It is also associated with thickened placentas and abnormal placental separation when birth occurs, as well as with dystocia (difficult birth) and agalactia (lack of milk production by the dam).

DR. KAREN MCDOWELL

Three images of the same horse's palmar artery before (A) or during (B and C) the treatment of adding endophyte-infected fescue seed to the diet. During the treatment period the artery would sometimes appear as in B (circled) or as in C—both significantly constricted compared to A.

In cattle, the most frequently reported signs of fescue toxicosis are associated with vasoconstriction (blood vessel constriction). This can result in cattle overheating in the summer because they cannot dissipate heat effectively and sometimes causes signs of gangrene in the winter due to insufficient blood flow to the hooves or tail switch. Fescue toxicosis in cattle is also associated with low average daily gain, poor growth rates, and lowered fertility. Literature reports of whether grazing endophyte-infected fescue can cause poor growth rates or reduced performance or fertility rates in horses are inconsistent, and researchers have not investigated the mechanisms that might contribute to these effects. Therefore, several years ago, the laboratory of Karen McDowell, PhD, associate professor at the University of Kentucky Gluck Equine Research Center, performed some experiments to determine if endophyte-infected fescue caused vasoconstriction in horses, similar to cattle.

McDowell, along with Laurie Lawrence, PhD, professor in UK's Department of Animal and Food Sciences, fed horses ground fescue seed containing either ergovaline and associated alkaloids or alkaloid-free fescue seed. They used Doppler ultrasonography to measure blood flow into and the diameter of the palmar artery in each horse's left foreleg, just above the fetlock joint. They found significant artery constriction in animals consuming alkaloid-infected fescue seed but not in animals consuming alkaloid-free seed (see figure). This was the first known report

Fescue Toxicosis

of endophyte-infected fescue causing vasoconstriction in horses consuming it, and the results appeared last year in the *Journal of Animal Science*.

Next, McDowell's laboratory set out to investigate if mares consuming endophyte-infected fescue seed had altered blood flow to their ovaries. This experiment was part of the Master of Science degree of Drew Hestad, MS, who is currently attending veterinary school at Auburn University. Again, the research team fed mares either fescue seed containing ergovaline and associated alkaloids or alkaloid-free fescue seed. Each of 12 mares received non-infected seed for one complete estrous cycle and infected seed for another complete estrous cycle. Mares receiving the infected seed had palmar artery and palmar vein constriction and, importantly, reduced blood flow in the corpus luteum, the structure on the ovary that produces the hormone progesterone. This was the first report of infected fescue causing reduced blood flow to mares' ovaries.

This spring, McDowell, along with Glen Aiken, PhD, from the USDA Forage Animal Production Unit located on UK's campus, and Michael Barrett, PhD, and Tim Phillips, PhD, both from UK's Department of Plant and Soil Sciences, will examine vasoconstriction and pregnancy outcomes in pregnant mares grazing fescue grass containing a novel endophyte. This grass produces alkaloids that give the grass the same competitive advantage over other forage grasses, but without the harmful alkaloids.

Although endophyte-infected fescue's deleterious health effects in mares have previously only been associated with problems in late gestation, this recent work demonstrates that endophyte-infected fescue can cause vasoconstriction in the legs and reduced blood flow to reproductive organs in mares. Researchers have yet to determine these effects' significance on growth, performance, fertility, or other physiological parameters. However, McDowell believes the use of Doppler ultrasonography to monitor palmar artery diameter in horses grazing endophyte-infected tall fescue pastures might provide a convenient and non-invasive biomarker to determine premonitory signs of fescue toxicosis, and she is continuing work in this area. UK

>Karen J. McDowell, MS, PhD, a researcher at the UK Gluck Equine Research Center, provided this information.

MASTHEAD

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The Horse: Your Guide to Equine Health Care

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UK Researchers Study Age-Related Susceptibility to *R. equi*

Researchers know that *Rhodococcus equi* can cause life-threatening infections in foals, but they are still trying to learn at what age foals are no longer at risk and develop a better way to study the pathogen in live horses.

At the 2014 University of Kentucky (UK) Equine Showcase, Macarena Sanz, DVM, MS, Dipl. ACVIM, a PhD candidate at UK's Maxwell H. Gluck Equine Research Center, presented results from a two-part study evaluating foals' susceptibility to *R. equi*.

R. equi is found worldwide and is spread through soil. Infection is rare in adult horses, typically only being seen in those with underlying immune system issues.


PHOTOS.COM

Foals, on the other hand, are very susceptible to *R. equi* infections and mainly develop disease between two and five months of age, Sanz said. Clinical signs of disease are similar to those of pneumonia, including fever, lethargy, increased respiratory effort and rate, and foals usually appear distressed. The bacteria causes characteristic abscesses (or lesions) in the lungs that can become severe enough to cause death.

Veterinarians diagnose *R. equi* infections using a combination of clinical signs; thoracic (chest) ultrasound or radiographs (X rays); blood work; and lung fluid culture.

Traditionally, veterinarians have treated *R. equi*. using antibiotics several times per day for four to eight weeks; however, Sanz said German researchers recently found

Susceptibility to R. Equi

that many affected foals recover without treatment. This is important, she said, as antibiotic resistance has been reported for drugs used to treat *R. equi*.

Although some research has been done (including by Sanz's Gluck Center research advisor David Horohov, PhD), *R. equi* is a difficult problem to study, Sanz said, because results from studies in mice aren't always applicable to foals.

"We need a foal model to better study this disease," she said.

To that end, Sanz and colleagues set out to develop an effective model of disease using live foals and investigate foals' age-related susceptibility to *R. equi*.

For the first part of the study, the team employed newborn foals residing in a pasture with their dams. They separated the foals into groups and challenged each group with 1,000,000; 100,000; 10,000; 1,000; or 100 *R. equi* bacteria. The researchers then monitored the foals daily for any abnormalities. In addition, they performed a physical exam twice a week, along with a weekly thoracic ultrasound and blood work.

At the end of the six-week study, the team determined that administering 1,000 *R. equi* bacteria to foals in the first week of life best mimics the natural disease progression veterinarians see in the field, Sanz said. Foals that received higher doses developed more severe clinical signs and lung scores than naturally infected foals generally do and sooner than foals do in the field. On the other hand, foals receiving lower bacteria doses did not develop clinical signs of disease.

In the next part of the study, and using their model from the first part, Sanz and colleagues challenged foals of varying age groups—2 to 7 days, 10-14 days, and 18-21 days old—to determine which group is at highest risk of infection. They used the same techniques to monitor the foals over the six-week study as in the first part.

Sanz and colleagues concluded that foals are susceptible to developing *R. equi* infection for at least the first two weeks of life before that susceptibility starts waning. Their susceptibility decreased greatly by the time they reached a month old in this experimental challenge.

Despite these advances, researchers and veterinarians still have much to learn about *R. equi*, Sanz said. UK

>Erica Larson is the news editor for The Horse.

GRAD STUDENT SPOTLIGHT

ALLEN PAGE

***From:* San Diego, CA**

Degrees and institute where received:

PhD, 2013, University of Kentucky
DVM, 2008, University of California, Davis
BS Animal Science (Equine Emphasis), 2004, University of California, Davis

Allen Page, PhD, DVM, decided to come to the University of Kentucky Gluck Equine Research Center for his doctoral degree because horses have always been his preferred species to work with professionally and as a hobby.

"Anyone who spends time with horses has at one point heard about or been affected by research that has come from the Gluck Center, as it is one of the preeminent equine research institutes in the world," Page said.

Page completed a one-year internship at the Hagyard Equine Medical Institute from 2008-2009 and became involved in a foal disease (*Lawsonia intracellularis*) research project while there. Page said that project led him down the research path and opened several doors for him at UK. One of the main goals for his doctorate research was that his work could be primarily of a clinical nature.

"Luckily for me, Dr. David Horohov (PhD), my boss and supervisor, has been incredibly supportive of this endeavor, as have the local farms who have supplied me with the samples from which most of my research is based," Page said.

Page's work at UK has mainly focused on *Lawsonia intracellularis*, a bacterium causing a disease primarily of young horses, weanlings, and yearlings. During his time at UK he has also studied *Rhodococcus equi* and equine influenza virus.

"We have developed a new test for *L. intracellularis* antibodies which allows for automated analysis of the results rather than other tests which rely on human interpretation," he said. "In addition, we have been working on determining potential risk and protective factors with respect to the disease *L. intracellularis* causes, equine proliferative enteropathy (EPE). These factors have been poorly characterized to date, so anything we find will be of great use to the equine community."

Page said he has just started his post-doctoral research, again in Horohov's laboratory, where he plans to continue his work on *L. intracellularis*.

"Because of the post-doctoral research, I have a little while before I have to start looking for a job, but I would ultimately like to end up in either a teaching/research position at a veterinary school or in a research position at a veterinary pharmaceutical company," Page said. UK

>Shaila Sigsgaard is an editorial assistant for the Bluegrass Equine Digest.

We Need Your Feedback!

We want to give you, our valued readers, the opportunity to share your insights about the Bluegrass Equine Digest newsletter. We have created a brief online survey to collect this information, and we would appreciate your help. The information that you share with us will be very valuable as we plan for the future.

This quick survey asks you to share your perceptions of the Bluegrass Equine Digest as well as some information about yourself. Rest assured, your responses are completely anonymous. Your answers simply help us to better understand our readers and what we can do to provide improved content.

The survey should only take a few minutes to complete. Click here to access it now.

Bluegrass Equine DIGEST SURVEY

NSAIDs Might Impair Horses' Immune Response to Influenza Vaccines

Although vaccination against infectious disease is a routine component of horse care, many owners still voice concerns about their horse's risk of having an adverse reaction to these injections. For this reason, veterinarians sometimes administer non-steroidal anti-inflammatories (NSAIDs) before vaccinating horses to reduce the risk and severity of such reactions.

Researchers from the University of Kentucky (UK) recently hypothesized, however, that because NSAIDs inhibit COX inflammatory mediators, they might also inhibit horses' immune response to vaccination. Whitney Zoll, BS, a veterinary student at Michigan State University's College of Veterinary Medicine, teamed up with researchers from UK's Maxwell Gluck Equine Research Center to assess NSAIDs' effect on horses' response to a commercially available equine influenza vaccine. She presented the results of their study at the 2013 American Association of Equine Practitioners convention, held Dec. 7-11 in Nashville, Tenn.

ANNE M. EBERHARDT

"Although the reasoning behind the co-administration of an NSAID with vaccination may seem sound, such treatments could affect the ability of the horse to respond to the vaccine," Zoll explained.

In the first of the two-part study, she and colleagues employed 18 adult horses ages 2 to 5 that had been previously exposed to equine influenza. They administered the NSAID flunixin meglumine (commonly known as Banamine) to nine horses prior to vaccination, and the other nine animals served as controls, receiving only the vaccine.

In the second part of the study they employed 18 influenza-naive yearlings. They co-administered the vaccine and flunixin meglumine to six yearlings, administered only the vaccine to another six, and the remaining six animals served as unvaccinated controls.

Then, the researchers collected blood samples from all study horses before the initial vaccination as well as 7, 14, 21, and 28 days after vaccination and used two methods—enzyme-linked immunoassay (ELISA) and hemogglutination inhibition (HI)—to detect equine influenza-specific antibodies. They also used real-time PCR to measure cell-mediated immune (CMI) response to the vaccine.

From the adult horses, the team found that:

- Vaccination increased the horses' influenza-specific HI antibodies and CMI response, though the IgG (immunoglobulin, or antibodies) response did not increase significantly;
- NSAID treatment had no effect on the total IgG response to the vaccine;
- NSAID administration significantly reduced the horses' HI antibody response to the vaccine; and
- NSAID administration significantly reduced the horses' CMI response to the vaccine.

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 grow to heights of 6 feet and is frequently found in pastures, rangeland, and along roadsides.

This plant's only redeeming value is that it produces bright red-to-purple flowers from May to September. Musk thistle's light, windborne seeds can move great distances to infest adjacent areas. Seeds germinate in the fall or spring and form rosettes. Generally, plants flower when they are 2 years old, although some plants act as annuals and produce seeds after a year of growth.

MUSK THISTLE GROWTH STAGES

Seedling | Rosette | Mature, flowering plant

Mowing must be timely for it to be effective—mow after the stem elongates but before seed heads are produced. Controlling musk thistle in pastures is relatively easy with herbicides that kill the thistle and does not harm pasture grasses. Consult your local Cooperative Extension Service personnel for a list of herbicidal controls in your area. Thistlehead weevil larvae eat this thistle's seeds and are an effective biological control in some areas of the United States. UK

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

Note: Musk thistle was the very first weed featured in the Bluegrass Equine Digest. It has been repeated here because Witt anticipated more of this weed in 2014 because of the dry summer and fall.

NSAIDs

From the yearlings, the team found that:

- At 28 days, vaccination resulted in an overall increase in IgG antibodies to equine influenza, as compared to the controls;
- NSAID administration reduced the immunoglobulin Ga-specific response;
- NSAID administration reduced, though not significantly, the HI antibody response; and
- NSAID administration reduced the CMI response.

So what do all these results mean? "NSAID administration caused a significant decrease in immune response to influenza vaccine in both previously exposed and naïve horses," Zoll concluded. "Thus, concurrent administration of NSAIDs when vaccinating can negatively impact a horse's immune response to the vaccine."

The study authors emphasized that veterinarians should take care when administering NSAIDs with vaccines, as they can reduce a vaccine's efficacy at stimulating antibody and CMI responses. As a result, horses with reduced immune responses might need to be vaccinated more frequently. UK

>Alexandra Beckstett is the managing editor for *The Horse: Your Guide to Equine Health Care*.

To Soak or Not to Soak Hay?

In areas or seasons where pasture is unavailable, horse owners turn to hay to make up for their horses' loss of grazing time. But choosing the right hay for a particular horse can present challenges. When feeding hay to horses, many questions arise: What kind, how much, should I buy processed hay, and finally, should I soak the hay for my horse? Soaking hay provides owners with the ability to alter some physical characteristics as well as the nutrient content of their hay if purchasing the ideal hay is not a feasible option.

Why should I soak my hay?

Suboptimal growing and harvesting processes can result in excess dust and/or mold in hay that can cause problems in horses. For example, dust can accumulate in hay grown near dusty roads, and mold can form in hay that has been baled in wet conditions. Dust particles can cause or worsen respiratory problems such as recurrent airway obstruction (RAO). Mold can cause digestive upset such as colic and also produces airborne spores that can cause respiratory diseases in horses. Many studies have shown soaking hay can reduce respirable particle concentration by at least 88%. Soaking can also reduce the amount of mold present.

LAUREL MASTRO

Soaking hay can reduce respirable dust and mold levels.

Another reason some horse owners soak their hay is to reduce the amount of sugars, or nonstructural carbohydrates (NSC), in the forage. Horses that require a low-sugar diet, such as those with laminitis or insulin resistance, might benefit from soaked hay. Soaking Orchardgrass hay for an hour, for instance, can reduce NSC by approximately 40%. If the hay started out with 14% NSC, after soaking the concentration would be below the 12% recommended level for feeding horses with laminitis.

In addition to removing sugars, soaking also redmoves some minerals. Crude protein, calcium, phosphorus, and magnesium concentrations all decrease with

To Soak or Not to Soak?

soaking. However, certain horses might benefit from the loss of specific nutrients. For example, researchers at the University of California, Davis, School of Veterinary Medicine recommend that horses with hyperkalemic periodic paralysis (HYPP), a metabolic genetic disease, consume a diet containing less than 1.5% potassium. Soaking Orchardgrass hay for an hour can reduce potassium concentrations from 2.2% to 1.3%. Soaking this hay for 12 hours can bring the potassium concentration down to 0.65%.

How long should I soak my hay?

The length of time you soak your hay results in significant differences in the reduction of respirable particles and nutrients. Soaking hay for 10 minutes can significantly reduce the number of respirable particles in grass hay, and longer soaking times do not necessarily result in a greater reduction in respirable particles. Soaking length does, however, affect sugar concentrations. Generally, the longer alfalfa or cool-season grass hays are soaked, the greater the decrease in these nutrients. In one study, researchers reported that when they soaked cool-season grass hay for an hour, NSC concentrations decreased from 13.8% to 8.6%. When they soaked the same cool-season grass hay for 12 hours, NSC concentrations decreased to 4.8%. Recommendations for hay soaking times range from 30 minutes to an hour to reduce nutrient concentrations for horses with special needs, while still being time-efficient.

Will my horse eat soaked hay?

One study has shown that when soaked hay is the only hay offered, there is no difference in a horse's voluntary intake compared to dry hay. Gradually introducing soaked hay into the diet might not only help avoid digestive upset due to a sudden diet change, but might also help a picky eater acclimate to new forage and maintain a normal feed intake.

What are reasons not to soak?

Although soaked hay has many beneficial effects, there are also reasons not to soak. Soaking hay causes a reduction in NSC concentrations, which is the highest energy component of the hay. For horses that have high nutrient requirements, such as performance horses, growing horses, or lactating mares, nutrient losses due to soaking might be problematic. If appropriate hay is already available, such as low-NSC hay for a horse with laminitis, there is no additional benefit of soaking. The soaking process is time-consuming, and soaked hay cannot be stored for extended periods due to the risk of mold. Furthermore, it is difficult to soak in bulk (round bales) for horses in group housing, and soaking hay in cold winter weather is challenging.

Take-Home Message

Veterinarians often recommend soaking hay when feeding horses diagnosed with RAO, HYPP, or laminitis. However, for time and labor's sake, owners should only soak hay if their ideal forage is not readily available. Hay soaking for short periods of time (30-60 minutes) is an acceptable management method for reducing respirable particles and certain nutrient concentrations. Feed soaked hay immediately after soaking to eliminate the potential for mold growth. Ultimately, owners should rely on forage analysis when choosing a hay that is best suited for their horse and only soak it if they must alter respirable particle or nutrient concentrations. UK

>Ashley Fowler, PhD candidate; Tayler Hansen, MS candidate; Brittany Harlow, PhD candidate; and Laura Strasinger, MS candidate, all in UK's Department of Animal and Food Sciences, provided this information.

UKAg Using Horses to Teach Emotional Intelligence

In March, University of Kentucky researchers will launch a second study of the effectiveness of Equine Guided Leadership Education, a process of using horses to teach emotional intelligence and leadership competencies to nurse leaders.

The encouraging results of a similar pilot study completed in November 2012 by the UK Center for Leadership Development in the College of Agriculture, Food and Environment and UK HealthCare helped make this next larger research phase possible. The new study's objective is to explore innovative ways to develop nursing directors' and nurse managers' emotional intelligence skills. This includes competency in the areas of self-awareness, self-management, social awareness, and relationship management, which create effective professional relationships and are critical to running safe, efficient, and high-performance hospital units.

"We are so pleased to be working again with the nurses at UK HealthCare on this larger study," said Lissa Pohl, the center's assistant director and project lead. "With around 60 participants, our data should be more conclusive as to whether working with horses develops emotional intelligence competencies in humans."

The study will compare the before and after emotional intelligence assessment scores of both a control group and an experimental group. Those nurse managers and directors who participate in the one-day Equine Guided Leadership Education workshop will also complete a qualitative survey that will provide information on what skills the nurses acquired.

The basic premise of equine-guided education is that horses provide in-the-moment feedback about leadership skills and, therefore, allow people to develop insights they can apply both in professional and personal lives. Participants will take part in exercises conducted from the ground, including observing herd behavior, leading horses, grooming and picking horse's feet, and moving unrestrained horses through an obstacle course or into an enclosure without touching them.

The Horse Institute, a New York-based provider of equine-assisted learning programs, is partnering with UK's Center for Leadership Development to publicize the research and raise funds for the study.

"We see again and again the amazing results our corporate groups and executives have when working with the horses," says Marie-Claude Stockl, executive director of The Horse Institute. "This is why we will match up to $2,500 for every dollar donated to this important research."

Information on the results of the previous pilot study and about how to contribute to the new study are available at www.ca.uky.edu/CFLD/research.php. All contributions are tax-deductible and will be used solely for the purpose of research in Equine Guided Leadership Education. UK

>Lissa Pohl, assistant director of the UK Center for Leadership Development, provided this information.

Equine influenza virus (EIV) and equine herpesvirus (rhinopneumonitis) cause the most common respiratory diseases in horses — and without a second vaccination, the risk increases.[1,2] Don't take the gamble. Help protect your at-risk horse by vaccinating with FLUVAC INNOVATOR® EHV 4/1 every six months. Download the Equine Influenza Calculator on iTunes® or learn more at **FluvacInnovator.com/calculator**.

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*EHV-1 and EHV-4

[1] Fretz PB, Babiuk LA, McLaughlin B. Equine Respiratory Disease on the Western Canadian Racetracks. *Can Vet J* 1979;20(2):58-61.

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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 causes 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. 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 establish, but results can last for years.

On the other hand, perennial and annual ryegrass provide short-term overseeding options for horse owners 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 costly 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 root is 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 (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 create problems for pregnant mares. Early March is the best time for spring overseeding in Kentucky.

High Traffic Area Pads

Sometimes seeding doesn't provide enough mud relief. 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 up into the pad and eventually engulfing the area. Typically, poured concrete will cost around $4 per square foot. The University of Kentucky Biosystems and Agricultural Engineering Department estimated the cost of a high traffic area pad around 80 cents per square foot.

High traffic area pads can be installed anywhere that equine or machine traffic

More Information

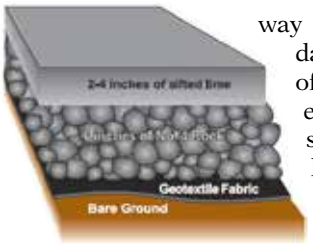
The University of Kentucky has several publications related to mud management. Please see the list of publications below for more information. These, as well as other pasture-related information, can be found at www.uky.edu/Ag/forage with equine specific publications listed under "Horse Links." Contact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

DEBORAH SIMON

- **High Traffic Area Pads for Horses**
- **Maintaining Healthy Horse Pastures**
- **Establishing Horse Pasture**

Managing Mud

is too high to establish cover, including around gates, water/feed sources, and along fencelines or shade areas.



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 giving a pasture a rest period, 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.

ERIN MORGAN

UK Equine Showcase and Kentucky Breeders' Short Course

More than 165 people attended the 3rd annual University of Kentucky Equine Showcase and 5th annual Kentucky Breeders' Short Course on Feb. 7-8, respectively. Equine research specialists from UK presented lectures on topics such as:

- Equine Cushing's disease in the aged horse;
- Is your horse fat? There's an app for that!;
- The Kentucky Horse Racing Necropsy Program: for the health and welfare of horses, humans and the racing industry;
- The economic impact of Kentucky's equine industry;
- Stem cells for equine tissue regeneration;
- Age-related susceptibility of foals to *Rhodococcus equi*;
- Genetics, health and performance;
- Why did my performance horse test positive for prohibited substances?;
- Reproductive anatomy and physiology of the mare;
- Starting and stopping a mare's cycle;
- Methods for evaluating stallion sperm;
- Methods to predict foaling;
- Diagnosing cryptorchids and ovarian tumors;
- Problems in newborn foals;
- Managing your stallion for a natural mating or artificial insemination program;
- Diagnosing placentitis (placental problems); and
- Problem mare panel.

More detailed summaries of specific talks will be highlighted in upcoming issues of the *Bluegrass Equine Digest*. To be added to the list for future Showcase and Short Course announcements, e-mail Jenny Evans at jenny.evans@uky.edu.

Annual Career Fair Unites College Students, Equine Industry

The University of Kentucky Ag Equine Programs will host its sixth annual UK Equine Career and Opportunity Fair from 4:30 to 7 p.m. March 4 at Spindletop Hall, in Lexington.

The event provides college students the chance to meet prospective equine industry employers and to learn about potential volunteer, internship, and part-time and full-time employment opportunities. Attendees can browse booths from area equine businesses as well as participate in sessions led by industry professionals who will offer tips and one-on-one career advice. New this year, participants will also have the opportunity to meet local boarding facility owners and trainers.

"This year's fair will be the biggest and best one yet. In years past, this has been an excellent event for students to connect with industry organizations. We had more than 220 students attend last year alone," said Elizabeth LaBonty, lecturer and internship coordinator in UK's Equine Science and Management undergraduate degree program, and whose equine careers' class is planning the event.

"This year we have expanded it to include businesses students can join for networking purposes, barns that are student-friendly, and trainers who offer riding and lessons," she said. "What makes this event so special is that it is student-initiated, student-driven, and student-planned. We have 13 students hard at work, and it's exciting to watch them work, hear their ideas, and see it all come together."

The event is free and will offer college-aged attendees the chance to visit local equine business and organization booths. Informational sessions will allow participants to explore opportunities related to pharmaceutical sales, graduate school, and jobs within the Thoroughbred industry. Food and drinks will also be provided, as will a shuttle service for students without vehicles on UK's campus.

"Being a part of the 2014 Equine Career and Opportunity Fair is such an awesome experience," said Courtney Schneider, a junior equine major from Frankfort, Ky. "It's really fun to learn what actually goes into planning an event. I have attended the fair in the past and made a lot of new connections by doing so. This year we hope to make it bigger and better than ever before."

Morgan Reece, a freshman equine major on a pre-veterinary path from North Vernon, Ind., echoed Schneider's sentiments: "I am excited for the fair because it has evolved into this event

COMMENTARY

'One Health' Helps Safeguard Horses' Health

A concept that has received considerable focus of late is that of "One Health." What exactly is One Health? It is the recognition that the health of humans, the health of animals (both domestic and wild), and the environment are all interconnected.

The health of humans is affected by that of animals and the condition of the environment, and vice versa. This concept brings physicians, veterinarians, ecologists and other scientists into a multidisciplinary collaboration to monitor diseases and the environment and to study the ways that diseases are transmitted and maintained in the environment. This concept is basically synonymous with the "One Medicine" and "One World" concepts.

While the term "One Health" has recently come into vogue, its importance has been recognized for many years, especially considering zoonotic diseases that can spread between animals and people. Likewise, changes in the environment affect both humans and animals. This includes land and water use and food supplies. The global nature of commerce and the heightened movement of both humans and animals make a combined approach to health essential. The threat of emerging diseases and pandemics that could first manifest in animals means that collaboration among physicians, public and animal health workers, and environmentalists is of critical importance to quickly recognize cross-species risks and implement protective measures. Just as importantly, the potential health impact must be considered in a collaborative manner as conservation and biodiversity programs are implemented.

How does this concept impact horses and the people who interact with them? Horses inhabit an environment that exposes them to people; other horses; domestic animals; wildlife; indoor conditions; and the outdoor environment with pasture, wooded areas, and water sources. The better the job we do in health management and planning in each of these areas, the more positive the effect on the health of our horses.

For example, the ecology of wildlife, including rodents, deer, skunks, and opossums, can place horses at risk for several diseases, including Lyme disease, equine protozoal myeloencephalitis, rabies, salmonellosis, and leptospirosis. Several of these diseases also pose a zoonotic risk to people. One quickly can appreciate how environmental management can have a profound effect on the health of horses and consequently people, and how health personnel must be cognizant of these interactions.

Another example that brings the One Health concept into focus in this issue of theQuarterly is the equine encephalitis update. West Nile virus transmission involves the interaction of wild birds, mosquitoes, horses, and humans. Bird deaths and encephalitis in horses can signal a risk of West Nile virus infection to people via mosquito vectors. Environmental control of mosquito populations can reduce the risk. The collaborative efforts of health officials in multiple disciplines are necessary to better control diseases of these types.

We must be forward thinking in our approach to health and realize that the subjects we specialize in are not within a vacuum and that an integrated One Health concept is needed to safeguard the health of horses.

CONTACT—Neil M. Williams, DVM, PhD, Dipl. ACVP—859/257-8283—nmwillia@uky.edu—University of Kentucky Veterinary Diagnostic Laboratory, Lexington, Ky.

This is an excerpt from Equine Disease Quarterly, funded by underwriters at Lloyd's, London, brokers, and their Kentucky agents.

Annual Career Fair

that offers students a variety of opportunities. The fair is so different than anything that I have had the chance to help plan. It is amazing to think that I can help bring all of these people together in one event to help us all out," she said.

Confirmed participants currently include Central Kentucky Riding For Hope, Darley Flying Start Program, Gluck Equine Research Center, Hagyard Equine Medical Institute, Keeneland, Kentucky Equine Management Internship, Kentucky Equine Humane Center, Kentucky Horse Park, Kentucky Horseshoeing School, Kentucky Quarter Horse Association, Life Adventure Center of the Bluegrass, Makers Mark Secretariat Center, New Vocations, North American Racing Academy, Rood and Riddle Equine Hospital, UK Ag Equine Programs, UK Animal and Food Science Graduate Association, and the United States Equestrian Federation.

Students and potential employers who would like more information about the UK Equine Career Fair can contact Elizabeth LaBonty at 859/257-2226 or e-mail equine@uky.edu. There is also an event Facebook face (University of Kentucky Equine Career Fair), which provides up-to-date info. For more information about UK Ag Equine Programs, visit www2.ca.uky.edu/equine. UK

>Holly Wiemers, MA, is the communication director at the UK Ag Equine Programs.

UPCOMING EVENTS

February 27, 3:30-5:30 p.m.

Department of Veterinary Science Equine Diagnostic Research Seminar Series, Veterinary Diagnostic Laboratory, Lexington, Ky. Hot topics in equine reproduction presented at the 11th International Symposium on Equine Reproduction in New Zealand. Drs. Barry Ball, Ed Squires, and Mats Troedsson, UK Gluck Equine Research Center.

March 4, 4:30-7 p.m.

UK Ag Equine Programs Career and Opportunities Fair, Spindletop Hall.

March 20, 6 p.m.

Kentucky Equine Networking Association (KENA) Meeting, Networking 6 p.m.; Dinner 6:30 p.m., Four Points by Sheraton Hotel, Lexington, Ky. Equine Cushing's Disease.