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Tips for Overseeding Central Kentucky Horse Pastures

Fall is the optimal season for horse pasture improvement in the Bluegrass, according to researchers at the University of Kentucky (UK). And within that window of time, mid-August through mid-September is considered the sweet spot for pasture establishment. This is the time of year when weed competition is low and ideal growing conditions exist for cool-season grasses.

One of the best pasture management practices available to horse owners is overseeding, or planting seed in a field with existing grass cover to fill in bare patches and thicken the stand. Overseeding helps ensure good ground cover, quality grazing, and an aesthetically pleasing pasture in the coming year without major pasture renovations. This can be done over the entire pasture or it can be limited to trouble areas.

Ray Smith, PhD, forage extension specialist in the UK College of Agriculture's plant and

soil sciences department, offers the following recommendations to increase the chances of a successful overseeding:

1. Apply any needed lime and fertilizer amendments. An up-to-date soil test will indicate nutrients needed for both established and growing plants. For more information, contact your local county extension agent or consult Soil Sampling and Nutrient Management in Horse Pastures at www.uky.edu/Ag/Forage/agr200.pdf.

2. Use high-quality seed of an improved variety. Use a variety that is a proven top performer under Kentucky conditions. The UK forage testing program tests the survival of cool-season grasses under grazing by horses and reports these findings in Forage Variety Trials, (www.uky.edu/Ag/Forage). High-quality seed has high germination rates and is free



Overseeding entails planting seed in a field to fill in bare patches and thicken the stand.

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of contamination from weed seed. Remember, Smith said, quality seed will produce a pasture that lasts for years; “cheap seed” will only lead to headaches.

3. **Plant enough seed.** Seeding rates are determined by the grass mixture to be planted. See Table 1 for the recommended seeding rates in pounds per acre as well as the optimal time to plant common forage plants.
4. **Use the best seeding method available.** Smith recommends no-till drill seeding for overseeding existing pastures. The goal of any method is to place the seed ¼ to ½ inch into the soil and cover it to achieve good seed to soil contact. Run the seeder in two directions across the field to ensure better coverage.
5. **Control competition.** Close mowing or grazing prior to overseeding in the late summer and fall will reduce weed competition.

6. **Use recommended waiting periods when applying herbicides.** In addition to limiting grazing of an overseeded pasture, also limit herbicide applications at critical times. Typically, seed at least six weeks after spraying and then wait until the grass seedlings are at least 4 to 5 inches tall before spraying again. Always follow herbicide label directions because some of the newer herbicides have even longer waiting periods. For more information, see Weed Management in Grass Pastures, Hayfields, and Other Farmstead Sites (www.ca.uky.edu/agc/pubs/agr/agr172/agr172.pdf).

7. **Allow time for seedlings to establish.** Returning horses to an overseeded pasture too soon can wipe out any seedlings by grazing or trampling. Ideally, a pasture should have one year of rest after overseeding before heavy grazing resumes; however, seedlings can generally tolerate a few sessions of light grazing. Harvesting the pasture once



Quality and amount of seed used is key.



An overseeded pasture needs a year of rest.

for hay after the grass has reached maturity before returning the pasture to full grazing is also recommended. If it is not possible to limit grazing for a full year, consider using temporary fencing and overseeding half of a pasture one year, then the other half the following year.

Other considerations when overseeding:

- Do not plant endophyte-infected tall fescue in pastures grazed by pregnant mares. Make sure you are instead planting endophyte-free tall fescue in broodmare pastures.
- Perennial ryegrass is a short-lived, cool-season grass that has exceptionally high seedling vigor and is often used to thicken troublesome areas. If perennial ryegrass is seeded at high rates (less than 25%), it will

Table 1. Common seeding rates and optimum seeding dates for horse pastures

Species	Rate lb/A (seeded alone)	Rate lb/A (in mixtures)	Optimum Seeding Dates
Endophyte-free tall fescue	20 - 40	10 - 20	8/15 - 9/15
Orchardgrass	15 - 30	10 - 15	8/15 - 9/15
Kentucky Bluegrass	15 - 30	10 - 15	8/15 - 9/15
Endophyte-free Perennial Ryegrass	20 - 40	5 - 10	8/15 - 9/15

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outcompete other grasses, which will result in bare spots as perennial ryegrass dies out in two to three years. Perennial ryegrass can be infected with an endophyte similar to that of tall fescue; therefore, only endophyte-free perennial ryegrass should be seeded in broodmare pastures.

- Purchase seed well in advance of overseeding. High quality seed is in great demand in the fall, and supplies run out quickly.
- Store seed in a cool, dry area to maintain germination levels. Refrigerators are excellent storage sites if room is available. Always store in rodent-proof containers. **UK**

Ray Smith, PhD, is a forage extension specialist at the University of Kentucky.

For more information about establishing horse pastures:

- UK extension publication “Establishing Horse Pastures” (www.uky.edu/Ag/Forage/id1471.pdf)
- UK Forage website www.uky.edu/Ag/Forages

POTOMAC HORSE FEVER CASES SEEN AT UKVDL

Between May and July, the University of Kentucky Veterinary Diagnostic Laboratory (UKVDL) confirmed three deaths and 14 positive cases of Potomac horse fever (PHF) in Kentucky.

In June a Thoroughbred mare from a Lexington clinic and a Saddlehorse mare from a West

WEED OF THE MONTH

Common name: Sandburs

Scientific name: *Cenchrus spinifex* Cav. (field sandbur);
Cenchrus longispinus (Hack.) Fern (longspine sandbur)

Life Cycle: Annual

Origin: Americas

Poisonous: No



Field Sandbur

Sandbur is the common name for several annual grasses that produce burs with multiple sharp spines. These grasses grow in pastures, landscape beds, gardens, fields, and roadsides. Field sandbur and longspine sandbur are the two most common species. Southern sandbur is another species that is more narrowly distributed along southern states. All are native to the Americas.

Sandburs have a fibrous root system and rely on the burs for reproduction (fruit is encased in the bur). Sandburs are spread easily because the burs stick to domestic and wild animals. Though nontoxic, mechanical damage can occur if horses consume the burs. Sandburs are particularly problematic at maturity. Because of their sharp burs, they inhibit grazing of desirable grasses; it is difficult for horses to selectively graze around the sandbur. Sandburs are a major weed of bermudagrass hay fields, in particular. Hay infested with sandburs also is undesirable because the burs inhibit hay consumption.

Sandburs are not easily controlled without killing desirable forage grasses. However, small patches can be removed by hand. Mowing usually is ineffective for controlling or preventing bur formation. Consult your local Cooperative Extension Service personnel (www.csrees.usda.gov/Extension) for sandbur control methods in your area. **UK**

William W. Witt, PhD, a researcher in the University of Kentucky Plant and Soil Sciences department, provided this information.

Liberty clinic both died from PHF. In July a 9-year-old Thoroughbred mare from a Lexington clinic also died. These three animals were submitted to the UKVDL for necropsy after showing

clinical signs and/or lesions consistent with PHF and testing positive on polymerase chain reaction (PCR), a technique used to amplify a single or a few copies of a piece of DNA.

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This acute disease is seen in spring, summer, and fall in Kentucky and can cause high fever, anorexia, colic, laminitis, abortion, diarrhea, and death in horses of all ages. It is caused by *Neorickettsia risticii*, a Gram-negative, intracellular bacterium with a liking for white blood cells. This organism is closely related to *N. helminthoeca*, the agent of salmon poisoning in dogs. *N. risticii*'s vector is a fluke that develops in freshwater snails, then is released as the parasite metacercaria, which are ingested by aquatic insects. A horse can become infected if he ingests an infected insect inadvertently. Outbreaks are often associated with horses turned out in pastures bordering creeks or rivers.

If PHF is detected early, veterinarians have reported treatment with oxytetracycline to be successful. If you suspect your horse has PHF, send 10 ml EDTA (ethylenediaminetetraacetate) blood and 5 g feces to UKVDL for PCR testing. Results will be available the same day or next day, thereby facilitating rapid, appropriate treatment. The charge for testing is \$35 in-state and \$52.50 out-of-state plus a \$10 accession fee. Also, please consider submitting to UKVDL for necropsy horses that have died after showing clinical signs consistent with PHF (costs \$90 plus a \$10 accession fee).

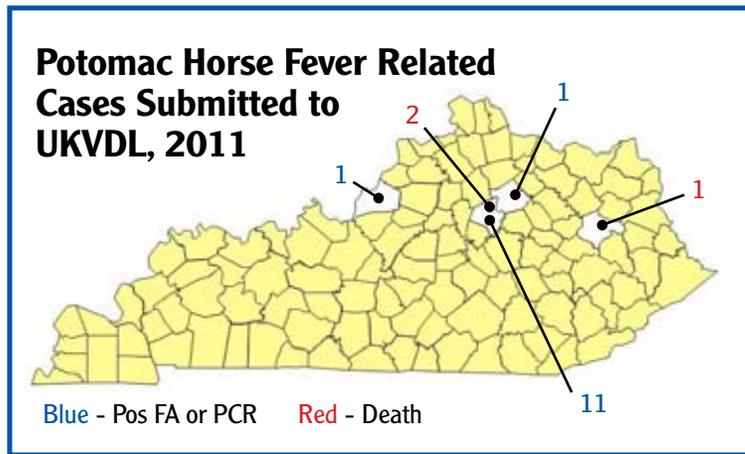
Several inactivated PHF vaccines are on the market, and vaccination trials have demonstrated

protection as high as 78%. Treating low-lying areas inhabited by snails can reduce the vector's impact. Any and all efforts to reduce horses' insect exposure can also be helpful as a preventive measure.

To stay abreast of what the laboratories are seeing in submitted cases, visit www.vdl.uky.edu and click on Animal Health Risk Outlook. An interactive Kentucky map will appear. Place your mouse cursor over counties in your practice or living area to see a 30-day moving window of diagnoses rendered at UKVDL and the Breathitt Veterinary Center in Hopkinsville, Ky.

For more information, contact Craig Carter, DVM, PhD, Dipl. ACVPM, UKVDL director and professor of epidemiology, at craig.carter@uky.edu or Jackie Smith, MS, UKVDL section chief, scientist II-epidemiology, at jsmit8@uky.edu. **UK**

Craig Carter, DVM, PhD, Dipl. ACVPM, UKVDL director and professor of epidemiology provided this information.



AVMA HONORS UK VETERINARIAN

Craig N. Carter, DVM, PhD, Dipl. ACVPM, director of the Veterinary Diagnostic Laboratory and a professor in the University of Kentucky (UK) College of Agriculture, received the 2011 American Veterinary Epidemiology Society Karl F. Meyer/James H. Steele Gold Headed Cane Award.

The American Veterinary Medical Association (AVMA) honored some of the nation's top veterinarians during an awards ceremony held July 19 in St. Louis, Mo. This annual award recognizes and honors the achievements of an individual who has significantly advanced human health through practicing veterinary epidemiology.

"Each recipient has worked tirelessly to improve the lives of both animals and people around the country and the globe," the AVMA stated in its announcement. "These individuals represent the very best in all areas of veterinary medicine, from education and public service to research and private practice."

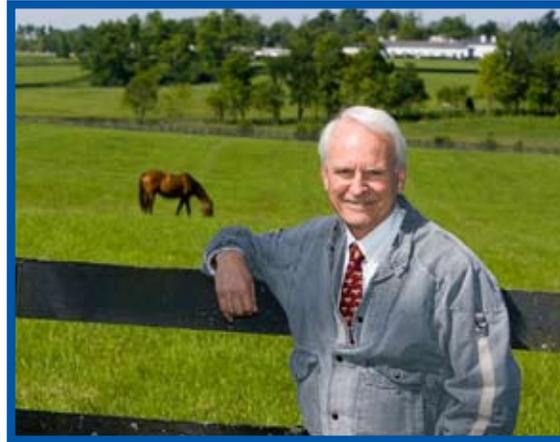
Carter received his veterinary and doctoral degrees from Texas A&M University and is a Diplomate of the American College of Veterinary Preventive Medicine. He worked at Texas A&M until 2005 when he joined UK as a professor of epidemiology in the Department of Veterinary Science and the College of Public Health. During his 30-year career he has been a leader in developing novel epidemiological surveillance,

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outbreak cluster detection, decision support, and laboratory information systems.

Carter currently has more than 200 scientific publications and presentations and two books to his credit, including the James H. Steele biography completed in 2009, the proceeds of which benefit student scholarships at the University of Texas School of Public Health. He was named Kentucky Veterinarian of the Year in 2009 and Texas Specialty Veterinarian of the Year in 2004.

Currently president of the American Association of Veterinary Laboratory Diagnosticians,



Dr. Craig N. Carter

Carter has held several leadership positions in veterinary organizations. In addition, he has been the executive director of the World Association of Veterinary Laboratory Diagnosticians since 2001, overseeing the planning of five international veterinary conferences in conjunction with the World Organisation for Animal Health.

For more information, visit www.avma.org. UK

Kathy Johnson is the news bureau deputy director in the Department of Public Relations at the University of Kentucky.

Biosecurity During Horse Events

With the equine herpesvirus-1 (EHV-1) myeloencephalopathy outbreak in May and June, biosecurity among show horses has been front page news. Summer months are prime time for large organized trail rides, horse shows, sales, parades, and other events where horses congregate. The show in Utah from which affected horses returned to multiple states illustrates very well how rapidly horses travel and can spread disease.

Following are biosecurity measures to implement when horses are congregated at events:

- Minimize nose-to-nose contact between horses. Do not allow another horse to sniff your horse's nose "to get acquainted."
- Do not share equipment for use with other people's horses. Alternatively, if any equipment is loaned, keep it away from your horses until it is cleaned with a detergent, rinsed, and properly disinfected.
- Do not use common water troughs. Bring your own water and feed buckets.
- Avoid common-use areas such as tack stalls used to groom and tack multiple horses. If these common areas must be used, cross-tie horses

instead of tying them to a post, wall, or other nose-to-nose contact area.

- Halters, lead shanks, and face grooming towels should be used on and restricted to one animal only.
- Wash your hands or use a 62% ethyl alcohol hand gel before and after handling or riding other people's horses.
- Early disease detection is paramount, especially contagious infectious diseases. Take horses' temperatures twice daily (morning and night) during the event and for two weeks after returning to the stable.
- Quarantine horses when they return to the barn or training facility after an event.
- Clean and disinfect horse trailers before they're used by other horses.

These precautions involve more work, time, and awareness on owner's parts. However, they will help reduce the risk of horses being exposed to multiple viral and bacterial diseases while on the road. UK

Roberta Dwyer, DVM, MS, Dipl. ACVPM, is a professor in the Department of Veterinary Science at the University of Kentucky.

Reprinted from the Equine Disease Quarterly, April 2011, Volume 20, Number 2, University of Kentucky, Department of Veterinary Science.

ENDOPHYTE-INFECTED TALL FESCUE AND BROODMARES



Tall fescue is a ubiquitous forage grass that became popular because of its drought tolerance, hardiness, and good forage performance. However, in the 1970s scientists discovered a high percentage of tall fescue harbors an endophyte that produces a toxic alkaloid with the ability to cause disorders in ruminants and horses when consumed in large amounts.

Garry Lacefield, PhD, University of Kentucky (UK) plant and soil sciences extension forage specialist refers to the Mid-South region, which includes Kentucky, as the “tall fescue belt” due to tall fescue quantity in the area.

Tall fescue covers an estimated 35 million acres in the United States, including pastures, high-traffic foot paths, golf courses, and backyards. A majority is endophyte-infected (EI). An endophyte is a fungus that lives symbiotically within the host plant and is not visible to the eye. The endophyte produces toxic alkaloids that,

when eaten, cause different disorders including tall fescue toxicosis.

Tall fescue toxicosis causes problems in broodmares during the last third of gestation. Thus, understanding and managing tall fescue is important, particularly as the foaling season approaches.

According to “Understanding Endophyte-Infected Tall Fescue and Its Effect on Broodmares” (University of Kentucky publication ID-144, www.uky.edu/Ag/AnimalSciences/pubs/id144.pdf), tall fescue toxicity in broodmares can manifest as follows:

- Poor animal performance (rough coat, low grade fever)
- Longer pregnancy (as long as 13-14 months)
- Agalactia (poor milk let-down)
- Dystocia (difficulty foaling)
- Thickened placenta (“red bag” foal)
- Reduced breeding efficiency following parturition (difficulty in rebreeding after foaling)
- Foals born weak or dead

If you suspect toxicosis, consult with your veterinarian immediately.

“It’s especially important for anyone with broodmares to find out if there is tall fescue in their fields,” said Bob Coleman, PhD, University of Kentucky horse extension specialist. “It’s easy to assume you have it, but you truly need to know. And think about all sources of it—grass bedding and hay can be full of tall fescue.”

The endophyte in tall fescue is only transmitted by seed, so regular mowing before seed heads

Additional Resources

- “Tall Fescue Endophyte Concepts,” by DM Ball, GD Lacefield, CS Loveland, SP Schmidt, and WC Young III. 2003. Oregon Tall Fescue Commission Special Publication 1-03.
- “Understanding Endophyte-Infected Tall Fescue and Its Effect on Broodmares,” by Robert J. Coleman, Jimmy C. Henning, Laurie M. Lawrence, and Garry D. Lacefield, University of Kentucky Cooperative Extension Service.
- “Tall Fescue Toxicity for Horses: Literature Review and Kentucky’s Successful Pasture Evaluation Program,” by S. Ray Smith, Laura Schwer, and Thomas C. Keene, University of Kentucky Plant and Soil Sciences.
- University of Kentucky Horse Pasture Evaluation Program: www.uky.edu/Ag/Forage/2011%20Pasture%20Eval%20Info%20&%20Enrollment%20Form%20with%20Small%20Farm%20Option%20Statewide%20New%20final.pdf

develop is a way to limit spread of EI tall fescue. Scientists have developed novel endophyte-free tall fescues, but EI tall fescue is still prevalent. Eradication is another option.

“Over the years we have learned how to manage it, but the concern is still there,” said Bill Witt, PhD, a professor in UK’s department of plant and soil sciences. Witt has been involved in research and eradication programs for EI tall fescue on some of Kentucky’s major Thoroughbred farms. His research results show that fall is the best

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time to remove tall fescue from pastures.

“Killing tall fescue with herbicide in September or October and then overseeding with bluegrass will result in fewer weed-prone areas,” Witt said. (See “Establishing Horse Pastures,” UK publication ID-147, www.uky.edu/Ag/Forage/id1471.pdf, for more information.)

Another way to limit toxicity is to plant legumes and other grasses, a strategy that dilutes EI fescue’s presence by limiting its ability to spread and by increasing the number of alternative grasses and legumes for animals to eat. “Horses won’t eat tall fescue first,” Lacefield said.

According to Lacefield, adding bluegrass, ryegrass, and clover can be effective means of EI fescue dilution.

However, broodmares should be removed from EI-infected pastures toward the end of gestation, as dilution of the toxic feed source is not effective at this point.

UK’s Horse Pasture Evaluation Program, a fee-based service conducted by forage experts, is a way for Kentucky horse owners to understand the composition of their fields and what forage is available for their horses. The program aims to analyze pasture management practices, reduce feed costs by improving pasture, and assess tall fescue toxicity risks for broodmares. The service provides a comprehensive evaluation of up to six paddocks or 80 acres on a farm and includes:

- An assessment of pasture species composition;
- The percentage of tall fescue plants infected

with fungal endophyte;

- The concentration of ergovaline (toxin) in tall fescue at the date of sampling;
- An estimate of ergovaline intake for horses on the pasture; and
- Additional management tools such as parasite management, soil maps, satellite maps, carrying capacity, and an action log for record-keeping.

“Tall fescue, like any plant, has its advantages and disadvantages,” Lacefield said. “The key for broodmare owners is to understand the disadvantages well in advance of the start of foaling season.” **UK**

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

HATS OFF DAY

The University of Kentucky Equine Initiative participated in Rood & Riddle Equine Hospital’s Hats Off Day to Kentucky’s Horse Industry held Aug. 6 at the Kentucky Horse Park. At right, Xinguo Wang (Casa), a graduate student in plant and soil sciences; Tom Keene, hay marketing specialist; and Lyndsay Jones, master grazer coordinator in animal and food sciences, were on hand to educate attendees on the types of plants horses eat. Far right, Pauline Bignon, a visiting student from France who is spending time at the Gluck Equine Research Center, helped children match foals with their parents based on coat color genetics. Inset, Catherine Whitehouse, a graduate student in animal and food sciences, assisted a girl in matching horseshoes with the type of horse that would wear them based on the sport. Other areas represented included equine economics, Saddle Up Safely, and general information about UK’s Equine Initiative.

Hats Off Day was instituted seven years ago as an equine industry initiative to promote awareness of the state’s equine industry and its role in Kentucky. More than 13,000 Kentuckians attended last year’s event, which concluded with the \$50,000 Rood & Riddle Kentucky Grand Prix, a show jumping competition held annually for 25 years.



GLUCK CENTER FACULTY TO SPEAK AT THOROUGHBRED CONFERENCE

Two Gluck Equine Research Center faculty members and an adjunct Gluck Center professor will speak at the 2011 Thoroughbred Pedigree, Genetics, and Performance Conference that will be held Sept. 7-8 at the Marriott Griffin Gate in Lexington, Ky.

James MacLeod, VMD, PhD, John S. and Elizabeth A. Knight chair, will speak about "Genetics 101: Basic terminology and concepts of gene structure and expression," and Ernie Bailey, PhD, will speak about "Genetics 101: Understanding basic genetic terms and applications." Matthew Binns, PhD, an adjunct professor in UK's Department of Veterinary Science, will speak about "Improving the efficiency of selecting Thoroughbred horses using molecular genetics." Binns works with The Genetic Edge in Midway, Ky.

The conference is presented by The Blood-Horse and Pedigree Consultants and was designed to complement the Thoroughbred Pedigree and Genetics Symposium last year. Internationally renowned pedigree, genetics, and performance physiology experts will share their knowledge on the latest in pedigree analysis, genetics research, and equine physiology testing as it relates to Thoroughbred performance. For more information, visit www.bloodhorse.com/seminars/seminar/register/3/the-2011-thoroughbred-pedigree-genetics-and-performance-conference. UK

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

GENOME BLUEPRINT FOR HORSE AND HUMAN VACCINES

Two strains of *Streptococcus* bacteria that have evolved to cause potentially fatal infections in either horses or humans share similar disease-causing mechanisms. Exploiting their genetic similarities could lead to novel vaccines for both man and animal, according to a review published in the *Journal of Medical Microbiology*.

Gluck Equine Research Center's John Timoney, MVB, MRCVS, MS, PhD, co-authored the paper "*Streptococcus equi*: a pathogen restricted to one host." Andrew Waller, PhD, was the lead

author, and Romain Paillot, PhD, was the other co-author. Both work with the Animal Health Trust's Centre for Preventative Medicine in Newmarket, Suffolk, United Kingdom.

Streptococcus pyogenes is responsible for tonsillitis, scarlet fever, and toxic shock syndrome in humans. Its equine equivalent, *S. equi*, causes a disease called strangles in horses. Each strain is well adapted to its particular host, yet their strategies for causing disease are remarkably similar.

Strangles is one of the most frequently diagnosed equine infectious diseases worldwide and costs thousands of dollars per horse to resolve. *S. equi* infects the lymph nodes in the head and the neck, leading to abscesses that can restrict the

Searching for UK Alums in the Horse Industry

Were you equine before the University of Kentucky had an official equine program? If so, the UK Equine Initiative is interested in hearing from you.

"As our Equine Initiative team travels the state, we frequently meet people who are distinguished alumni of UK and work in the horse industry, but we have no way of identifying them as equine alumni through UK's database," explained 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. "We are seeking to create a list of all of these people so we can provide them with access to UK equine information and ask for advice on our programs. We are interested in their wisdom and expertise as we develop programs appropriate for Kentucky's signature industry."

So we are asking the question: Did you graduate from the College of Agriculture or another UK college before 2007 and are now part of the horse industry, either professionally or recreationally? Or, did you participate in equine clubs or teams at UK but had a non-equine major? If so, we'd like to hear from you at equineinitiative@uky.edu. UK

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

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airways—giving the disease its name.

The secret to *S. equi*'s success is its ability to trade genes with similar bacteria such as *S. pyogenes*, explained Waller. "These strains share clever tricks, like secreting 'super antigens' that allow the microbes to send the immune system into turmoil yet avoid detection themselves," he said.

Another shared trait is the production of SlaA—a toxin related to Australian brown snake venom, which is associated with serious disease in humans. "The resemblances between the two strains prove it is unrealistic to study human and animal pathogens in isolation, in our quest to understand and fight them," Waller said.

Data show that cases of serious, invasive *S. pyogenes* infection have increased in recent years in England.

"Tracking the genetic evolution of microorganisms such as *S. equi* will give us clues as to how its human counterpart, *S. pyogenes*, has evolved in the past and may evolve in the future," Waller said. "This will help equip us with the tools to combat the diseases caused by both pathogens."

Researchers are using the emerging genetic data of *S. equi* as a blueprint to develop a new vaccine against strangles, which ultimately could benefit both horses and humans.

"One vaccine against strangles that is currently being trialed uses antigenic components that share similarity with their *S. pyogenes* counterparts to stimulate immunity," Waller said. "If this approach can protect horses against *S. equi*, it is

feasible that a similar cocktail of *S. pyogenes* antigens may be the basis for an effective vaccine for humans, which is an exciting prospect." UK

Edited press release from the Society for General Microbiology.

LAURIE LAWRENCE RECOGNIZED WITH ASAA FELLOW AWARD

Laurie Lawrence, PhD, professor in the department of animal and food sciences at the University of Kentucky (UK) was recently awarded the American Society of Animal Science Fellow Award, which recognizes career achievements in research.

Since joining UK in 1992 Lawrence has made many significant contributions to the field of equine nutrition. She has studied the equine athlete, the broodmare, and the growing horse.

Furthermore, Lawrence was one of the first equine nutritionists to focus on performance horses. She and her graduate students used a systematic approach in understanding the metabolism of exercising horses with particular emphasis on factors that limit maximum performance. Her investigations focused on fuel utilization and acid-base balance during exercise. Her research expanded the knowledge base relative to the contribution of various nutrients to energy production during exercise. Her studies on nitrogen metabolism during exercise and the role of dietary protein on horses' response to exercise were the first ever conducted.



Dr. Laurie Lawrence

Pre-exercise feeding practices vary widely in the racing industry. Lawrence's studies shed new light in this area, as well. She found little evidence that the type of feeding practice (fed versus fasting) prior to high-intensity exercise had any effect on the exercise response. Her studies also demonstrated that several nutrients, including vitamin E, selenium, fructo-oligosaccharides, and omega-3 and omega-6 fatty acids, affect immunological enhancement.

Through cooperative efforts with the U.S. Department of Agriculture's Agricultural Research Service, Lawrence has developed a major research effort involving horses' use of pastures and conserved forages. Lawrence's research is revealing seasonal variations' effects on pasture nutrient composition and the factors that influence pasture intake by horses. She and her students have developed innovative methods for assessing horses' grazing preferences, which she has combined with new laboratory methods of estimating forage digestibility in horses. Her

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work in this area resulted in her receiving the Alfalfa Public Service Award from the Kentucky Forage and Grassland Council.

In 1998 she was recognized by her American Society of Animal Science (ASAS) peers when presented with the American Feed Industry Association's Award for Distinguished Research in Nonruminant Nutrition. This was the first time a woman had received this award and only the second time an equine nutritionist has been so honored. She served as president of the Equine

Nutrition and Physiology Society and in 1999 received its distinguished service award. In 2008 she received the first ASAS Equine Science Award.

In 2004 Lawrence was appointed to chair the National Research Council's (NRC) subcommittee to revise the "Nutrient Requirements of Horses." This was the first time a woman chaired a nutrient requirement series publication in the NRC's history. The publication, released in 2007, and other NRC publications are used by

nutritionists in academia and in the feed industry worldwide and are considered the best source of nutrient requirement information.

Lawrence is an active member of ASAS and has served on the Board of Directors of the Society and as recording secretary. She has also served as Chairperson of the Nonruminant Nutrition Committee and the Horse Committee of the Society and currently serves on the Editorial Board of the *Journal of Animal Science*.

Her active basic and applied research programs have resulted in 75 refereed journal publications, 12 book chapters, and more than 150 scientific abstracts, research reports, and popular articles. [UK](#)

Edited from Lawrence's nomination packet submitted for American Society of Animal Science award.

CONGENITAL FLEXURAL LIMB DEFORMITIES IN FOALS

A new foal's arrival is an exciting time. After 11 months of gestation and caring for the mare and watching her belly expand, delivering a healthy foal is one of the best experiences for a horse owner. Sometimes, however, foals are born with flexural limb deformities (FLD). Many of these foals present with severe FLD called contracted foal syndrome (CFS), which in its worst form involves all four



Announcing the Equine Immunization Support Guarantee, a Pfizer Animal Health program that provides financial support to cover diagnostics and treatment for horses suspected of contracting a disease for which they have been vaccinated. As Pfizer Animal Health's commitment to you, this program can only be offered through a licensed veterinarian.

For details of qualifying vaccines, visit PfizerEquine.com/ISG or contact your representative.

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(LIMB DEFORMITIES ...)

limbs, the neck (torticollis), skull (wry nose), and spine (scoliosis). The latter of these foals is usually euthanized. However, other less severely affected foals with only one or two affected limbs involved might recover with surgery, splinting, and therapy.

The availability of the horse genome sequence and the subsequent development of genomic tools have facilitated a study of FLD/CFS led by Teri Lear, PhD, associate professor in the genetics/genomics group at the University of Kentucky (UK) Gluck Equine Research Center. Collaborators on the study include Ernie Bailey, PhD, professor in the genetics/genomics group at the Gluck Center; Uneeda Bryant, DVM, assistant professor in pathology at UK's Veterinary Diagnostic Laboratory (UKVDL); Craig Carter, DVM, PhD, Dipl. ACVPM, director of the UKVDL; Steve Reed, DVM, Dipl. ACT, Rood & Riddle Equine Hospital; and Luigi Auletta, a visiting veterinarian from Italy working at Rood & Riddle.

"We have collected DNA samples from affected foals for a pilot study," Lear said. "All of the foals had all four limbs affected and most had scoliosis, wry nose, and torticollis. Our preliminary results highlighted three regions on three different chromosomes indicating the condition is complex and may involve multiple genes. Genomic testing is expensive, and we still need to test many more horses to hone in on the candidate genes that might cause FLD/CFS."

This condition has been reported primarily in

Thoroughbreds but also occurs in Standardbreds, American Saddlebreds, Quarter Horses, and other breeds. Males appear to be more commonly affected, and multiple affected limbs occur more often than a single affected limb. To make matters worse, foals with FLD/CFS can be a serious risk to mares during birth. Up to 16% of dystocia (difficult birth) cases might be due to FLD/CFS affected foals. This might require the mare to undergo a Caesarian, or C-section, increasing her risk of death.

The cause of FLD/CFS in horses is unknown. Muscle, tendon, and ligament tissues appear normal when examined microscopically by pathologists. Theories as to the cause include uterine insufficiency, exposure to toxins during embryonic development, dietary issues, and viral infections of the mare during pregnancy. However, recent family studies suggest the condition could be inherited. Some mares have produced up to four affected foals even when each foal is sired by a different stallion and the mare has been housed on different farms. This rules out a management component to the disorder. Individual cases suggest the condition might be inherited in a dominant fashion, but might not always develop depending on other genetic



FLD/CFS might be heritable.

factors. This could explain why some foals have a milder form of CFS than do others.

The skeletal anatomy of a horse's leg is comparable to the anatomy of the human hand and foot. A horse essentially walks on the equivalent of a human finger or toe. The horse's cannon bone, or metacarpal, is similar to a bone in the palm of your hand. The human phalanges, or finger bones, are comparable to the bones that comprise a horse's hoof and pastern.

If a child is born with tightly clenched fists and club feet, he or she might have one of several muscle contracture syndromes known collectively as distal arthrogryposis (DA). The child might also have other congenital abnormalities such as spinal curvature (scoliosis), facial muscle contractures, and a small mouth. Most children are of normal intelligence but others have developmental retardation.

Mutations in one or more genes that control skeletal muscle contraction cause DA in humans. These gene mutations produce abnormal muscle protein that disrupts normal muscle function during fetal development, resulting in limb contractures. The skeletal muscles contract, but are unable to relax as normal muscles do. Most of the mutations are inherited, but their mode of inheritance can vary. Marked variation

(LIMB DEFORMITIES ...)

in clinical signs within and between families might occur. Mutations also can arise spontaneously as new or “de novo” mutations. Some children with DA respond to surgery and physical therapy, while others do not.

The varying levels of severity and clinical signs displayed by a horse with CFS are similar to those seen in human DA. Some affected foals undergo treatment and have complete remission. About a third of these foals go on to have performance careers, but another third die or are euthanized prior to one month of age. FLD/CFS continue to be the most common congenital abnormality diagnosed at UK’s Veterinary Diagnostic Laboratory.

Our future success will depend on support from the horse industry in providing research samples and funds to carry out a larger study. All information is kept confidential including horses’ and farms’ identities. We expect, one day, to develop a diagnostic test that will help farm managers avoid matings that might produce affected foals and to determine which foals will respond to treatment. The participation of breeding farms, veterinarians, and horse owners is imperative if the causes of FLD/CFS are to be understood.

Contact: Teri L Lear, PhD, 859/257-4757, ext. 81108, equigene@uky.edu, Maxwell H. Gluck Equine Research Center, University of Kentucky, Lexington. **UK**

Teri Lear, PhD, associate professor in the genetics/genomics group at the Gluck Equine Research Center, provided this information.

USDA Forage Research Unit at UK has Equine Focus

The University of Kentucky (UK) is home to a unique on-campus U.S. Department of Agriculture (USDA) research unit that focuses a significant portion of its research on horses. It is the only unit in the country to have an equine focus within its traditional forage-based national mandate. The USDA Forage-Animal Production Research Unit (FAPRU) works in collaboration with UK on key forage-equine research projects.

“Only this unit in Lexington has a significant equine emphasis. A few focus on disease, but this unit is the only one that focuses on forage-based production issues,” said James Strickland, PhD, the unit’s research leader. “The mission is to improve the sustainability and competitiveness of U.S. forage-based enterprises. The primary focus is on improving the efficiency of utilization of forage by cattle, horses, sheep, and goats while protecting the environment, including soil and water.

“Forage animals take a dietary product we can’t use and convert it to something we can use. They are productive at converting a nonfood product (forage) to edible human food products and fiber (meat, milk, leather) on land that is marginal or even unsuited to grain crop production and provide for entertainment and leisure time activities in the case of the equine industry,” he said.

“We appreciate having a federal lab located on UK’s campus, and we are grateful to Senator Mitch McConnell for helping secure this valuable research facility,” 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.

Twenty-five scientists from Agricultural Research Service and UK conduct forage-based joint research projects that encompass issues of equine health, nutrition, and reproduction, plant and soil sciences, and more.

“The primary focus is on improving the efficiency of utilization of forage by cattle, horses, sheep, and goats while protecting the environment, including soil and water.”

Dr. James Strickland

Some of the unit’s areas of equine research include laminitis, bermudagrass suitability for horse pastures, and blood vessel response to tall fescue compounds called alkaloids.

Isabelle Kagan, PhD, plant physiologist with the Agricultural Research Service, is determining the types and amounts of water-soluble carbohydrates (simple sugars and fructans) in forages sampled under various environmental conditions. Her research goal is to provide information to help manage grazing for horses at risk for pasture-associated laminitis.

(USDA FORAGE RESEARCH ...)

"It's a very painful disease for horses, and it causes large financial losses in the horse industry," she said. "I would be delighted if some of the carbohydrate work that I'm doing could provide information that would help in understanding the relationship between pasture carbohydrates and laminitis."

In collaboration with David Williams, PhD, UK plant and soil sciences turfgrass science specialist, Glen Aiken, PhD, research animal scientist, evaluated the forage quality and digestible matter yield of bermudagrass turf types. Bermudagrass is a warm-season perennial used for horse grazing in the south. Bermudagrass cultivars have been bred and developed with the cold tolerance to persist in the upper transition zone.

"Turf types could be better suited than forage types in handling the heavy traffic and impaction

in horse pastures, but no research has been done to determine the forage quality of these bermudagrasses," Aiken said.

Research animal scientist James Klotz, PhD, is involved in a project with reproductive biology specialist Karen McDowell, PhD, Gluck Equine Research Center, that examines effects on equine muscle contraction and blood circulation to different alkaloids that have been isolated from tall fescue. The team has also begun looking at the effects on reproductive blood vessels, such as the uterine and ovarian arteries and veins.

Klotz also is interested in better understanding how ergot alkaloids cause vasoconstriction, or narrowing of the blood vessels. **UK**

Karin Pekarchik is an editorial officer in UK's College of Agriculture.

UPCOMING EVENTS

Sept. 10

University of Kentucky College of Agriculture Roundup, E.S. Good Barn

Sept. 15

Kentucky Equine Networking Association (KENA) Meeting. "Stem cell therapy in horses" by Scott Hopper, DVM, surgeon and partner at Rood & Riddle Equine Hospital. Networking 6 p.m., Dinner 6:30 p.m., Clarion Lexington-North, Lexington, Ky.

Sept. 24

Draft Horse Field Day, Asbury College, Wilmore, Ky.

University of Kentucky College of Agriculture equine specialists will again team up with Asbury University for a draft horse day Sept. 24 from 10 a.m. to 2 p.m. The event is family friendly and includes educational stations, demonstrations, and a groundbreaking ceremony.

ASBURY UNIVERSITY
DRAFT HORSE DAY
PLUS MISSION FARM GROUND BREAKING CEREMONY
SEPTEMBER 24, 2011
FREE ADMISSION
Lunch Available for Purchase \$3 to \$5, provided by the Jessamine County Cattlemen's Association

SCHEDULE
 10:00 am Opening Ceremony with "Bride of Broom"
 10:30 am Draft Horse Team Competition
 11:00 am Children's Activities (games, crafts & more)
 12:00 pm Student Demonstration (feeding and rescue 6:00 am)
 1:00 pm Mission Farm Groundbreaking Ceremony

EDUCATIONAL STATIONS
 Dr. Ray Smith "So Start in My Pasture"
 Dr. Mark Colburn "Choosing a Horse Feed"
 Dr. Mary Ross "What's Bugging My Horse?"
 Dr. Jenie McLeod "Horn and Hoof Care"
 Asbury University Student "The Mission Farm Project"

LOCATION
 Asbury University Equine Center

DISCOUNTS
 From New Circle Road in Lexington, head south on US-60 toward Harrodsburg. After 12.5 miles turn left towards Wilmore. Just south of Wilmore, on mile number 6 turn right onto Sherry Hill Road, which continues to the Equine Center.

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