

HIGHLIGHTING RESEARCH  
AND OUTREACH EFFORTS AT  
THE UNIVERSITY OF KENTUCKY

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# EQUINE SCIENCE REVIEW

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College of Agriculture,  
Food and Environment

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*Equine Science Review is a monthly College of Agriculture, Food and Environment newsletter that highlights important equine work happening at the University of Kentucky.*



*Photo courtesy Dr. Jimmy Henning.*

# STRETCHING DOLLARS TO STRETCH PASTURES

Horses are expensive. In fact, every part of them is expensive, from feed to shoes to barns to pastures. As an agronomist for the University of Kentucky, I've spent the last 11 years making recommendations on pasture improvements. But as a new farm owner, I've suddenly found myself facing the same struggles as many other farm managers and want to share how I have balanced what the experts say with what reality gives us. Today's topic...fall nitrogen fertilizer.

The recommendation is easy: virtually all horse pastures need nitrogen fertilizer in the fall. Ideally, 30-40 lbs of nitrogen per acre in September and again six weeks later, or 50-60 lbs of nitrogen per acre once in October or early November. This year, I chose to apply just once in October for several reasons of varying legitimacy. 1) Some of our pastures have a fair bit of summer weedy grasses, such as nimblewill, which I don't want to fertilize. October is past their active growth window and therefore will not encourage further growth and spread. 2) Fertilizer isn't cheap, so one application is more budget friendly. 3) Convincing my husband to take the truck and get the buggy and fertilizer and hook to the tractor and spread the fertilizer and return the buggy takes a lot of effort. So, once it is.

However, when I went to local farm supply store to set all this up, I was faced with some new issues I hadn't yet considered: Not only is the price of nitrogen fertilizer up drastically (urea was quoted to me at \$720/ton and increasing daily), it's also very hard to come by.

The graph in Table 1 illustrates the increasing price of urea as well as DAP and Potash for this fall. After speaking with several others, it sounds likely that these increases will continue into next year and are driven by weather delays, increases in natural gas costs and high shipping costs. The store I spoke with, that services

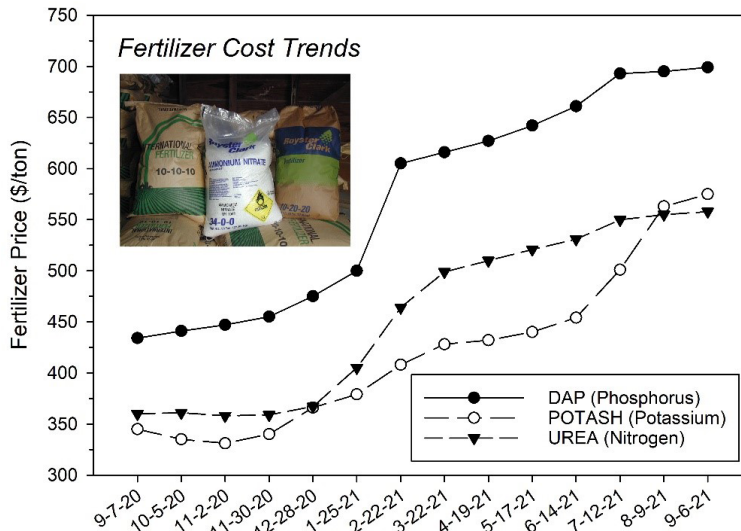


TABLE 1. IMAGE COURTESY KRISTA LEA.

many big Thoroughbred nurseries in Central Kentucky, also said they can't swear they can get any more fertilizer this year, and if they do, it will likely be in November.

It would be easy to walk away from this right now, saying it's too expensive and too scarce to be worth my time. But I know the benefits of fall nitrogen are worth the effort. Nitrogen is used in photosynthesis to create energy, which essentially means it helps the plant do whatever it's already doing. In the spring, that is producing a seedhead. This is why hay fields are often fertilized in the spring, to boost yield. But pastures will have a natural flush of growth in the spring, and most horse farms, including my own, don't have enough horses to utilize all that spring growth (nor should we). So we have to mow.

Fall is another story. At this time of year, plants are getting ready for winter. They are storing energy in their roots, producing new shoots, and expanding their leafy growth to protect their crown (the growing point close to the soil) from snow and cold. These are the things I want my grasses to do more of. Fall nitrogen helps plants stay green longer into the winter, survive the winter better

and green up earlier in the spring. All of this translates to less hay feeding this winter without needing more mower time.

A study in 2006-2008 found that forage cover was nearly 20% higher on treatments receiving adequate fall nitrogen applications compared to the control or those with minimal nitrogen added. Figure 2 shows this data, and illustrates that 30 to 60 lbs of actual nitrogen twice in the fall, or 60 lbs in November, are statistically identical in their benefits for increased forage cover the following spring. A 20% increase in forage cover may not sound like much, but imagine if you didn't have that cover, you'd likely have 20% more weeds in the spring. With this information, I believe, fall nitrogen is worth the effort.

So I have two problems facing me: price and scarcity. I can't directly fix either of these, but I can adjust my plan to accommodate.

Clearly, fertilizing every pasture on the 28 acres I have is out of my budget at this time, so I had to think critically about where the fertilizer (assuming I get some) is best used. I have two larger areas that haven't had horses grazing on them in several years, though I do hope to graze them soon. These



**Figure 2. Percent Forage Cover in March following Fall Nitrogen Applications**

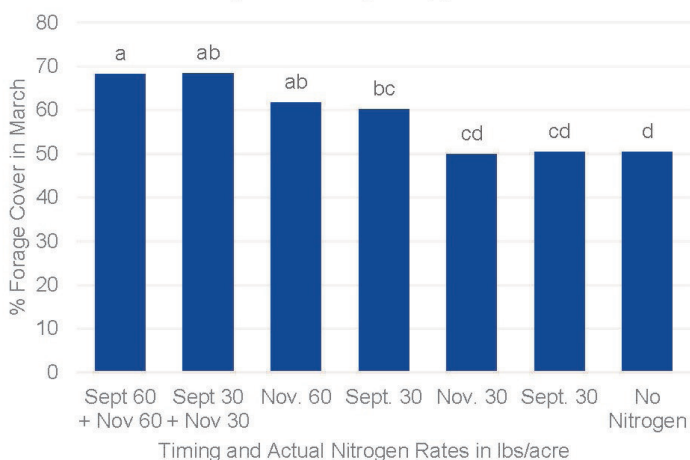


FIGURE 2. IMAGE COURTESY KRISTA LEA.

areas have few weeds, excellent grass cover and likely good roots, so I can skip them to save some cash. Additionally, I have a few small paddocks that are (intentionally) overgrazed. In fact, desirable grasses are essentially grazed out. And I plan to winter a few horses on these, so there really isn't any hope for survival of a stand here. I'll skip them, and plan to overseed and rest these in the spring. Now I'm down to fertilizing about 10 acres, areas that have been grazed aggressively, but still have desirable grasses that could rebound with a boost. The price will still be high, but much more manageable.

Now that I have a plan of where to fertilize, I need to find some. Before I start frantically calling every farm supply store I can find, I need to consider all the different types of nitrogen fertilizer. Nitrogen, in its pure state and under reasonable temperature and pressure, is a gas. In fact, the air we breathe is almost 80% nitrogen. But getting it into the ground in a usable form to plants is the tricky part. The most common form in Central Kentucky is urea, which is 46% nitrogen and 54% inert (CH<sub>4</sub>N<sub>2</sub>O for my fellow science

nerds). Nitrogen can be applied in other forms, such as ammonium nitrate (NH<sub>4</sub>NO<sub>3</sub>) as well as mixed fertilizers that contain sources of nitrogen, phosphorous and potassium. Table 2 contains actual nitrogen rates and how that translates in commercial formulations. Keep these in mind when

**Table 2. Actual nitrogen conversions for common fertilizers**

Actual Nitrogen	Urea (46-0-0)	Ammonium Nitrate (36-0-0)	Triple 19 (19-19-19)	10-10-10
40	87	111	211	400
60	130	167	316	600
80	174	222	421	800
100	217	278	526	1000
120	261	333	632	1200

TABLE 2. IMAGE COURTESY KRISTA LEA. | *Krista Lea, MS, University of Kentucky Research Analyst and*

*UK Horse Pasture Evaluation Program Coordinator. Co-Owner and Manager of Texata Farms, LLC, a retirement and layout facility in Versailles, Kentucky.*

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Schwer, L., S. R. Smith, C. Huo, T.C. Keene, J. Lowry, G. Roberts and J. Morrison. 2009 Late Fall Nitrogen Applications for Horse Pastures. American Forage and Grassland Council Annual Conference.

me any money. Additionally, this fertilizer would also add phosphorus and potassium to the pasture. Having completed a soil test back in the spring, I know my pastures are already high in both of these, so adding extra is simply a waste of funds and can potentially lead to runoff into nearby streams. Mixed fertilizers are beneficial when pastures need several amendments, but costly and environmentally unsound if used without a soil test.

In the time it took me to write this article, about 10 days, the price I will be paying for urea has increased more than \$100/ton. And with no end in sight, I gave the go ahead to lock in my fertilizer before it gets any higher in the hope that some arrives. Fall nitrogen isn't essential to the survival of my pastures. I know that if I can't find it, or can't afford it, most of my grasses will still green up in the spring and once again provide my horses with plenty of grazing. I'll simply need to start feeding hay a little sooner, and a little longer, and maybe need more

weed control this spring if the stands are thin. But if I am able to find and pay for it, I know the efforts and expense will pay off next year with greener, healthier and more robust pastures.

you start comparing prices and shopping for alternatives. And if you find a price that too good to be true, it probably isn't true.

My father-in-law was recently bragging on the cheap price he paid for triple 19 fertilizer and suggested I go that route. Triple 19 (labeled as 19-19-19) contains just 19% nitrogen, along with 19% phosphorus and 19% potassium. That means to apply my goal of 100 lbs of nitrogen per acre, I would need to apply 217 lbs of urea or 526 lbs of triple 19. So unless his Triple 19 is less than half the price, it really won't save

# HOWE NAMED ACTING CHAIR OF UK'S DEPARTMENT OF VETERINARY SCIENCE; NIELSEN ASSOCIATE CHAIR

After a search for acting department chair, Daniel Howe, PhD, has been named acting chair of the University of Kentucky Department of Veterinary Sciences and Martin Nielsen, DVM, PhD, Dipl. ACVM, as acting associate chair and director of graduate studies.

The terms are for one year, starting Jan. 1, 2022, pending university approvals. Howe has been associate chair and director of graduate studies in the department since 2014 and 2009, respectively. Nielsen holds the Schlaikjer Professor of Equine Infectious Disease.

A committee led by Reddy Pali, PhD, chair of UK's Department of Entomology, is being formed to conduct a global search for a full-term department chair. The anticipated timeframe is for the successful candidate to be named

by July 2022 and be in place by January 2023.

"I would like to thank David Horohov, who has served as chair for the past six years, for his leadership and dedication to this department that plays a critical role to the equine industry. David has positioned this department to be excellent in operations, service and research quality, and I am sure the position will be attractive to many qualified candidates," said Nancy Cox, PhD, Vice President for Land Grant Engagement and Dean, College of Agriculture, Food and Environment.

| *Source: UK College of Agriculture, Food and Environment edited announcement.*



TOP PHOTO, DR. DAN HOWE. BOTTOM PHOTO, DR. MARTIN NIELSEN. PHOTOS COURTESY UK COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT.

## EQUINE INNOVATORS PODCAST: EXPLORING DEMAND FOR WILD HORSES

Jill Stowe, PhD, professor in the Department of Agricultural Economics at the University of Kentucky, recently studied how many American horse owners are willing to adopt wild horses and what type they'd select.

This [podcast](#) is the 11th episode in our "Equine Innovators" podcast series, brought to you by Zoetis. You can find "Equine Innovators" on TheHorse.com, Apple Podcasts, Spotify, Stitcher, and Google Podcast.



About the researcher: Stowe is a professor in the Department of Agricultural Economics. She previously served as director of the UK Ag Equine Programs. Her areas of specialization include economics of the equine industry, decision-making under risk and uncertainty and neuroeconomics.



ISTOCK PHOTO.

# EQUINE INFECTIOUS DISEASE CONFERENCE BRINGS PROFESSIONALS TOGETHER

The live session of the 11th International Equine Infectious Diseases Conference has come to a close. The virtual five-day event brought researchers and veterinarians together from around the world to share and provide the latest information on infectious diseases of horses.

“This is an important conference for those of us who work in this field, as it is the only conference focused on the horse and the infectious diseases that affect horses,” said James Gilkerson, professor, University of Melbourne, and president of the IEIDC. “Infectious diseases cause serious health and welfare problems for horses across the globe. Horses and other equids are still used widely in developing countries for transport of people and goods, while the use of horses in sport in developed countries has seen a huge increase in the number of horses that are transported around the world for competitions.”

One of the larger topics discussed at this year’s conference was the April outbreak of the equine herpesvirus 1 in Valencia, Spain, at a spring event for northern European show jumpers. The eruption of EHV-1 affected approximately 600 of the 750 horses participating. The virus is primarily spread by exhaled droplets which led to rapid infections of others and can cause neurological problems as well as abortions in pregnant mares.

In the case of the April outbreak, unauthorized transporting of shedding horses helped the spread, which most notably occurred in Northern Europe. The outbreak caused the cancellation of several European events, including the World Cup.

“There were suddenly three or four horses with fevers and they couldn’t find out why,” said Lutz

Goehring, DVM, PhD, Warren Wright, Sr. - Lucille Wright Markey Endowed Chair in Equine Infectious Diseases at the University of Kentucky’s Gluck Equine Research Center. “Diagnostics where started, however it took another week before the first neurological cases started appearing. Typically, this is a reactivation of a latent virus in a single horse and it spreads from there.”

As a result of the virus, new by-laws have been introduced by the Federation Equestre Internationale (FEI), the sport’s governing body, aimed at maintaining necessary levels of biosecurity to prevent outbreaks at venues in the future. At least 20 horses were euthanized because the disease’s severity and several more are still recovering. Another disease which shared the spotlight at the conference was a novel Rotavirus B, which was recently discovered by scientists in UK’s Department of Veterinary Science. Rotavirus B is similar to Rotavirus A, which first appeared in the 1970s. Rotavirus A has been one of the most common causes of foal diarrhea in horse breeding centers around the world. Infectivity and severity of disease generally decline with increasing foal age and are not considered to be a cause of diarrhea in horses over the age of 6 months. Current diagnostic tests for equine Rotavirus A cannot detect rotavirus B.

“In February we started to see a severe diarrhea increase in foals,” said Feng Li, DVM, PhD, professor and William Robert Mills Chair in Equine Infectious Disease at the Gluck Center. “Affected foals were not responding to treatment of antibiotics and their dams had been previously vaccinated with a rotavirus A vaccine during their pregnancy. Diagnostic investigation of clinical samples failed to detect diarrhea-causing patho-



gens. That’s when we knew we were working with something new. Using a next-generation sequence technology, we identified an abundant amount of novel rotavirus B genome in fecal specimens from affected foals with the absence of other known enteric pathogens, indicating an etiological role of this rotavirus B in neonatal foal diarrhea.”

Emergence of the novel rotavirus B in foals clearly warrants further investigation due to the significant impact of the disease in neonatal foals and its economic impact on the equine industry.

The International Equine Infectious Diseases Conference brought together 121 speakers who gave a total of 159 presentations. Those interested can still register for video presentations and discussions from the conference [here](#). All seminars and material given at the live sessions can still be viewed for one year after registering.

| *Jordan Strickler is an agricultural communications specialist in the University of Kentucky’s College of Agriculture, Food and Environment.*



# EQUINE ROTAVIRUS B AND NEONATAL FOAL DIARRHEA

Group A and B rotaviruses are significant enteric pathogens that cause diarrhea of variable severity in humans and domestic animals. Despite no difference in clinical signs or symptoms, it has been well documented that there is no antibody-mediated cross-protection between groups A and B. The horse is a unique species in which only group A rotaviruses typically cause foal diarrhea outbreaks.

During the 2021 foaling season (February and March) in central Kentucky, increased frequencies of diarrhea were noted in neonatal foals between 1 and 4 days of age. Mares had been previously vaccinated with an inactivated monovalent equine rotavirus A vaccine during their pregnancy. Foals developed diarrhea at approximately 24 hours of age and diarrheic episodes typically lasted three to four days. Some farms experienced up to 100% morbidity. Newly born foals on affected farms quickly developed diarrhea, suggesting a highly contagious disease. Clinical signs included inappetence, weakness, dehydration, severe electrolyte imbalance and watery yellow and foul-smelling diarrhea. Hemorrhagic watery diarrhea was noticed in some cases. None of the foal's dams developed diarrhea.

Diagnostic investigation of fecal samples from diseased foals, which included PCR and microbial culture, failed to detect diarrhea-causing pathogens, including equine rotavirus A. Interestingly, metagenomic sequencing data identified an abundant amount of novel rotavirus B genome in fecal specimens from affected foals and absence of other known enteric pathogens, suggesting an etiological role of this rotavirus B



PHOTO COURTESY UK COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT.

in neonatal foal diarrhea. Further evidence linking rotavirus B to this outbreak of highly contagious foal diarrhea is supported by the poor responses of the affected foals to antibiotic treatment as well as seemingly ineffective equine rotavirus A-specific passive maternal antibodies in affected foals against this new virus. Subsequent analysis of 33 foal diarrheic samples by RT-qPCR identified 23 rotavirus B-positive cases (69.69%). Despite a small sample size, the prevalence of equine rotavirus B in diseased foals was similar to that reported in equine rotavirus A-associated foal diarrhea outbreaks.

Bioinformatic analysis of the viral genome data showed that the protein sequence of all 11 viral segments had greater than 96% homology (relatedness) with group B rotaviruses previously found in ruminants. Furthermore, evolutionary studies demonstrated clustering of the equine virus with group B rotaviruses of caprine and bovine

strains that circulated in the USA. These results indicate the possibility that the equine rotavirus B was of ruminant origin.

In summary, evidence suggests that a novel, ruminant-origin, group B rotavirus has emerged in horses and was associated with outbreaks of neonatal foal diarrhea in the 2021 foaling season in Kentucky. Emergence of the ruminant-like group B rotavirus in foals clearly warrants further investigation due to the significant impact of the disease in neonatal foals and its economic impact on the equine industry.

| *Emma Adam, DVM, PhD, DACVIM, DACVS, assistant professor; research and industry liaison at the Gluck Equine Research Center, and Feng Li, DVM, PhD, Professor and William Robert Mills Chair in Equine Infectious Disease, UK Gluck Equine Research Center; provided this information. Source: October 2021 Equine Disease Quarterly.*

## Rotavirus in foals

### ABOUT ROTAVIRUS

Rotavirus diarrhea is a very serious, life threatening disease in foals usually caused by Rotavirus Group A viruses. Adult horses are not typically affected by it. Rotaviruses are highly contagious between susceptible animals. Vast numbers of virus particles are shed in the diarrhea of affected animals, but only small numbers of virus particles are needed to cause disease via fecal-oral transmission. Typically, different rotavirus groups and strains infect specific species, however, it has been documented that strains can ‘jump’ species, making it possible for strains not typically associated with humans to infect people. As such biosecurity precautions should always be taken when working with animals with diarrhea.

### CLINICAL SIGNS

Rotavirus diarrhea in susceptible foals causes watery diarrhea, anorexia as the foal stops nursing, abdominal distention usually due to gut inflammation, transient gut stasis and often colic. Massive fluid and electrolyte loss through diarrhea, as well as not nursing, causes rapid and severe dehydration and electrolyte derangements that can be fatal. Susceptible, infected foals will show signs of disease as young as 24-48 hours of age.

### ROTAVIRUS EFFECTS ON THE GUT

The virus damages the mature cells of the small intestine at the tips of the villi (microscopic finger-like projections that increase gut surface area for digestion and absorption). This massively reduces

the foal’s ability to digest milk, especially the milk sugar, lactose, leading to maldigestion and malabsorption. It can also create an environment in the gut that can allow pathogenic bacteria to overgrow, possibly creating other problems.

The severity of disease depends on the foal’s age, immune status and the number and virulence of rotavirus particles ingested. Typically, younger foals are more severely affected.

### TREATMENT OF ROTAVIRUS DIARRHEA

Treatment is supportive with the mainstay of treatment being intravenous fluid therapy. This allows foals to maintain their hydration and electrolyte balance, and are administered by or under the guidance of your veterinarian. In very young foals, your veterinarian may also place the foal on prophylactic antibiotics to help prevent bacteria in the gut translocating across the inflamed gut wall and causing a joint infection, for example. Since rotavirus is a viral infection, antibiotic therapy does not treat the infection directly. Your veterinarian may also place the foal on gastric protectants to reduce the chance of gastric ulcer development. In some cases, not allowing or strictly limiting nursing can be beneficial but **must only be done in conjunction with your veterinarian or at a veterinary hospital** because such young foals are so dependent on nursing for their hydration and energy needs, and they require intensive care should nursing be restricted.

### PREVENTION

Strict hygiene and biosecurity are essential to prevent the spread of rotavirus among foals. No ‘one size fits all’ biosecurity protocol exists and as such designing one for your farm is a team effort between you and your veterinary team.

Common basic hygiene which includes wearing gloves and clean protective clothing to handle foals, using foot dips with an appropriate disinfection outside stalls, dedicated footwear for foaling barns, reducing animal, human and vehicular traffic in barns and between barns, not using leaf blowers or power washers in barns with horses in them, are just a few items among many to consider in a protocol.

### DISINFECTANTS

Bleach is not an appropriate product to use in a farm/barn situation. Its activity is too easily destroyed by organic material to be in any way, shape or form effective. Peroxygen compound or Phenolic compound disinfectants are recommended. A list of such compounds may be found [here](#) but it is important to read the instructions. Examples of such disinfectants include Rescue®, Oxy-Sept 333®, Virkon-S®, One Stroke Environments®, Pheno-Tek II and Tek-Trol. (The University of Kentucky does not endorse or promote any commercial products. These names are for informational purposes only.)

Additional resources relating to biosecurity measures may be found



on the Equine Disease Communication Center website [here](#).

When thinking about disinfection please remember:

- to clean surfaces of grease and organic debris
- replace foot dip container disinfection solution frequently to prevent inactivation by organic debris
- to mix the correct dilution of disinfectant solution carefully – stronger is not always better!
- to allow sufficient contact time for disinfection

### VACCINATION

Zoetis® offers a Rotavirus Group A [G3 strain] vaccine for the administration to mares using three doses given at months 8, 9 and 10 of gestation during each and every pregnancy. This vaccine has been immensely helpful in preventing neonatal Rotavirus Group A diarrhea in foals. However, we do see Rotavirus Group A (G3 and G14 strains) as a cause of diarrhea in older foals, aged 75-120 days of age. At this age the disease is typically mild and self-limiting with minimal veterinary intervention required. Foals typically

recover completely from rotavirus infections with timely veterinary care and supervision.

### EQUINE ROTAVIRUS B

During the season of 2021, a new rotavirus strain, Equine Rotavirus B, was identified in neonatal foals affected with severe watery diarrhea. The discovery of this virus was the result of a massive collaborative effort between our farm and veterinary community and researchers at the University of Kentucky Gluck Equine Research Center and Veterinary Diagnostic Lab.

Research into this virus continues with the ultimate goal of being able to generate a vaccine to help prevent Rotavirus B neonatal disease in foals.

**OUR RECOMMENDATIONS FOR THE PREVENTION AND CONTROL OF THIS DISEASE ARE THE SAME AS FOR ROTAVIRUS GROUP A PENDING FURTHER INFORMATION AT THIS TIME. WE CANNOT STRESS HIGHLY ENOUGH THE NEED FOR PROPER BIOSECURITY PROTOCOLS ON YOUR FARMS AS THE CRITICAL TOOL TO PREVENT AND CONTROL INFECTION.**

### ROTAVIRUS TESTING

Understanding rotavirus and its prevalence in our equine population is important for us to gain traction with this disease and gain leverage to win research grants to continue our work.

We encourage you to test fecal samples from foals with diarrhea in consultation with your veterinarian (please chill the sample and submit the same or next day). The University of Kentucky Veterinary Diagnostic Lab offers single or combined qPCR tests for Rotavirus A strains [G3 and G14], as well as the novel Equine Rotavirus B.

We wish you every success for the 2022 season. Please contact us if we can help you or your veterinarian.

Contact: Gluck Equine Research Center:  
Emma Adam, [emma.adam@uky.edu](mailto:emma.adam@uky.edu)

# EQUINE DISEASE QUARTERLY WILL TRANSITION TO ELECTRONIC FORMAT IN 2022

Since its inception in 1992, the Equine Disease Quarterly has been distributed worldwide in a printed format. The funding to make this possible was provided through the generosity of Lloyd's of London, Underwriters and Brokers and their Kentucky Agents, and in later years, by Underwriters at Lloyd's, London. Circulation of the Quarterly went from several hundred copies in October 1992, to approximately 17,000 copies in 2021, and reached readers in over 87 countries.

In late 2020, Lloyd's Underwriters confirmed that because of changing circumstances, it could no longer sustain support of the Equine Disease Quarterly beyond 2021. Thankfully, a new sponsor, Equus Standardbred Station, Inc., recently came forward and generously agreed to help the continued distribution of this worthwhile publication.

This recent development provides a long overdue opportunity to bring about a change in how the Quarterly can best be made available to its readership. Considered opinion is to transition from mailing print copies to an electronic format, where each issue is available on the internet. This will have the important advantage that once each issue is posted, it will be immediately available to the readership with a link to a pdf for downloading or printing. In time, this will likely give rise to an increase in circulation of the Equine Disease Quarterly among veterinarians and equine stakeholders, especially since the publication is available at no charge and material published is not subject to copyright.

While the distribution of



PHOTO COURTESY UK COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT.

future issues of the Quarterly will change to an electronic format, the purpose of the publication will remain the same as was stated in the Commentary of the first issue, October 1992. It is to provide information on the incidence of particular diseases/syndromes and the emergence or re-emergence of previously unreported diseases. This will apply to outbreaks occurring in Kentucky, the USA, and other parts of the world. It will also serve as a reference source of the latest information on disease prevention and control strategies. In preparation for the upcoming changes in how the Quarterly will transition into an electronic format, those currently receiving printed versions of the publication are strongly encouraged to review the information provided as follows and return their responses by no later than November 15, 2021.

To continue receiving the Equine Disease Quarterly, please scan the QR code or go to the following [link](#). In a brief survey, you'll be asked to provide your e-mail address, as well as your name and mailing address as print-



ed on the Quarterly.

Please reply by November 15, 2021, to continue receiving your issue without interruption. Thank you for your ongoing interest in receiving the Equine Disease Quarterly.

| *Peter J. Timoney, MVB, MS, PhD, FRCVS, Frederick Van Lennep Chair in Equine Veterinary Science at the Gluck Equine Research Center.*

# BREEDERS' CUP 2021: HOW THE RSTL AND UK RESEARCH WORKED TO IMPROVE THE DEL MAR SURFACES

## UPGRADED DAILY TESTING, NEW DATABASE

The best surfaces, whether dirt or turf, perform consistently from day to day, year to year and for every stride of the horse. During the 2021 Breeders' Cup hosted at Del Mar, the independent non-profit Racing Surfaces Testing Laboratory (RSTL), with its research partner, the University of Kentucky College of Agriculture, Food and Environment, will usher in a new era of standardized measuring protocols and data management that will help improve the consistency of racing surfaces.

The RSTL will use Del Mar as a beta test site during the Breeders' Cup for its upgraded daily testing, developed in collaboration with UK and new database developed in collaboration with The Jockey Club. More accurate daily testing equipment for both dirt and turf will be combined with real-time data collected from maintenance equipment during racing. Especially in low humidity environments, additional data on the moisture content of the dirt racetrack during the race card can facilitate improved surface consistency.

Moisture, racing and training and equipment traffic all change the track; the RSTL's Maintenance Quality System mitigates those effects by taking a series of daily and longer-term standard measurements that are added to a database to allow for comparisons between 14 leading North American racetracks and coordination of efforts to minimize adaptation by Breeders' Cup horses to a new surface.



PHOTO COURTESY DR. MICK PETERSON.

## HOW THE MQS TESTS THE SURFACE BEFORE RACING STARTS

Biomechanical surface testing, ground penetrating radar and composition testing are conducted before horses are allowed to train or race on a surface to ensure the racetrack is ready for use. During a one- to two-day review period, equipment is inspected, electronic infrastructure is updated and the racing surface is tested.

During biomechanical surface testing a robotic horse is used to replicate the loads and speeds of a Thoroughbred at a gallop. This machine is used to determine if the surface is consistent and provides the same vertical and horizontal loads on the leg as other tracks that participate in the Maintenance Quality System. The comparisons include the Del Mar racetrack, as well as other racetracks used by Breeders' Cup

horses, including New York Racing Authority, Keeneland, Churchill Downs and Santa Anita. Ground penetrating radar is used to inspect the cushion and base, which supplements grade checks performed by the track maintenance crew. A total of 12 tests are performed on the sand used on the surface to ensure that it is consistent.

## HOW THE MQS TESTS THE SURFACE DURING RACING

Measurements taken before racing starts are only part of the effort. Every race day, changes in material and moisture must be controlled. Divots are repaired on the turf course; the dirt track is graded; and real-time weather data is transmitted from the track at 15-minute intervals. Moisture and cushion depth are measured daily on the main track. Daily measurements of





PHOTO COURTESY DR. MICK PETERSON.

moisture and “going” are made on the turf track. These checks ensure the consistency of the maintenance

and provide information which can be used for making training and racing decisions.

#### ABOUT DEL MAR'S RACING SURFACES AND PERSONNEL

Del Mar has two racing surfaces: a one-mile dirt main track and a 7/8th-mile inner turf track. The main track has 85% medium to fine sand and 15% silt and clay. The turf track has a sand profile with fiber reinforcement growing a hybrid Bermuda grass. Two experts work closely to ensure quality racing surfaces on both tracks.

Dennis Moore, racetrack superintendent, is a second-generation racetrack superintendent with 50 years of experience in racing. Leif Dickenson, who oversees the track superintendent, is an agronomist who also has decades of experience on racetracks and other equestrian surfaces. Both Moore

and Dickenson were integral to the development of the Maintenance Quality System and have participated since its inception.

During Breeders' Cup they will be assisted by Kaleb Dempsey, an engineer at the Racing Surfaces Testing Laboratory, and Mick Peterson, a professor within UK's Department of Biosystems and Agricultural Engineering and co-founder of the Racing Surfaces Testing Laboratory.

| *Karin Pekarchick, MS, senior extension associate for distance learning in the UK Department of Biosystems and Agricultural Engineering and founder of the UK Female Equestrian Health and Wellness Community of Practice, and Mick Peterson, PhD, professor of biosystems and agricultural engineering in the College of Engineering, provided this information.*

## DO YOU OWN OR MANAGE A HORSE FARM IN CENTRAL KENTUCKY?

As a follow up to a recent survey, researchers invite you to take part in a survey about horse farm operations and use of conservation practices. The purpose of this study is to understand motivations and barriers to the implementation of conservation practices on Central Kentucky horse farms. Through this study, we hope to improve water quality in Central Kentucky and better understand horse farm concerns. Interested participants will be asked to take a 15-minute survey.

You may be eligible to participate if you:

- Are over the age of 18
- Own or manage a horse farm in Central Kentucky

Visit [this site](#) to learn more. For more information, contact:

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# AVERAGE FIRST FREEZE OF FALL

The end of the growing season is approaching or has come. The release of the new climate normals earlier this spring means we also have a new set of frost/freeze normals. In doing so, I looked at the average first freeze date for various locations across the Commonwealth based on the 1991 to 2020 climate normals. As you can see in the table below, several locations now see their average first freeze occur sometime in late October or early November.

Average Date of First Freeze (1991-2020 Normals)			
ASHLAND, KY US	10/23	LEITCHFIELD 2 N, KY US	10/15
BARBOURVILLE, KY US	10/24	LEXINGTON BLUEGRASS AP, KY US	10/28
BARDSTOWN 5E, KY US	10/25	LONDON CORBIN AP, KY US	10/25
BARREN RVR LAKE, KY US	10/29	LOUISVILLE INTL AP, KY US	11/07
BEATTYVILLE 4N, KY US	10/25	MADISONVILLE, KY US	11/01
BOWLING GREEN WARREN CO AP, KY US	10/31	MAMMOTH CAVE, KY US	10/30
CINCINNATI NORTHERN KY AP, KY US	10/25	MAYSVILLE WWTP, KY US	10/30
CYNTHIANA, KY US	10/23	MONTICELLO 3 NE, KY US	10/26
DIX DAM, KY US	11/01	MT STERLING, KY US	10/18
ELIZABETHTOWN WP CS, KY US	10/25	MT VERNON, KY US	10/24
FRANKFORT CAPITAL CITY AP, KY US	10/24	MURRAY, KY US	11/01
GLASGOW, KY US	10/27	NOLIN RVR LAKE, KY US	10/22
GRAYSON 2 E, KY US	10/17	PADUCAH, KY US	10/28
GREENSBURG, KY US	10/24	PAINTSVILLE 1E, KY US	10/25
HENDERSON 8 SSW, KY US	10/29	PRINCETON 1 SE, KY US	10/24
HODGENVILLE LINCOLN P, KY US	10/25	QUICKSAND, KY US	10/24
HOPKINSVILLE, KY US	11/02	SOMERSET 2 N, KY US	10/30
JACKSON, KY US	11/01	WILLIAMSTOWN, KY US	10/29

**Data Courtesy:** National Centers of Environmental Information, <https://www.ncei.noaa.gov/access/search/data-search/normals-annualseasonal-1991-2020>

Following the shift to a warmer climate across Kentucky over the past decade, the average first freeze dates above have been pushed back in the fall season. In the chart below, I compared the average first freeze date for various locations across the state according to three different sets of normals: 1971-2000, 1981-2010 and 1991 to 2020. As you can see, some stations have seen their average first freeze date pushed back a week or more over the past 20 years.

## Comparison of Kentucky Freeze Normals

Station	Fall Freeze 50%		
	1971-2000	1981-2010	1991-2020
LEXINGTON BLUEGRASS AP, KY	25-Oct	27-Oct	28-Oct
LOUISVILLE INTL AP, KY	30-Oct	4-Nov	7-Nov
CINCINNATI NORTHERN KENTUCKY INTL AP, KY	17-Oct	24-Oct	25-Oct
PADUCAH BARKLEY REGIONAL AP, KY	25-Oct	26-Oct	28-Oct
LONDON CORBIN AP, KY	16-Oct	22-Oct	25-Oct
BOWLING GREEN WARREN CO AP, KY	23-Oct	27-Oct	31-Oct

IMAGES COURTESY MATT DIXON, METEOROLOGIST.

Source: University of Kentucky Ag Weather Update by Matt Dixon, Meteorologist

# UK CENTERS SUCCESSFULLY TRAIN AGRICULTURAL COMMUNITY MEMBERS TO RECOGNIZE SIGNS OF MENTAL DISTRESS

Agricultural work can be a source of stress, anxiety and depression due to its unpredictability and physical and mental demands. University of Kentucky College of Agriculture, Food and Environment researchers are helping train Kentuckians to recognize signs of mental distress in members of their local agricultural community. The program is seeing great success.

Through the college's Southeast Center for Agricultural Health and Injury Prevention and the Central Appalachian Regional Education and Research Center, Kentuckians who regularly interact with farmers and rural health care providers are learning Question-Persevere-Refer. QPR is a nationally recognized suicide prevention program that helps individuals recognize when someone is facing mental hardship and connect them with health care professionals. UK researchers took the existing QPR program and developed additional materials to help participants identify farm-related stressors and agriculture-specific behavioral clues that may indicate a farmer is going through a difficult time.

"When the 2018 federal farm bill appropriated money for mental health services for farmers, it really opened up the conversation about mental health in the agricultural community almost overnight," said Joan Mazur, PhD, professor and deputy director of the Southeast Center for Agricultural Health and Injury Prevention. "People really seem to appreciate the opportunity to talk about mental health, use the word suicide and have conversations about struggles



PHOTO COURTESY UK COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT.

they see in their communities." During the summer of 2020, with support from a U.S. Department of Agriculture's Agrisafe subaward, the Southeast Center trained 17 certified QPR Institute trainers who, in turn, used those skills to train 415 Kentuckians as part of their Agricultural Community QPR for Farmers and Farm Families program.

"We really wanted to leverage this important policy 'moment' and develop a community-based support network to address this difficult issue," Mazur said. "We asked people to participate who we knew were already embedded in rural agricultural communities, working with farmers on a regular basis and who really cared about farmers' mental health. We wanted to find ways to break down the boundaries that farmers can put up."

Alethea Bruzek, UK Cooperative Extension Service agent, was among the UK and Kentucky State

University extension agents and faculty members initially trained in QPR. Since being trained, she has trained others.

"I have a unique opportunity to reach farm families through my work in extension," said Bruzek, Boyle County family and consumer sciences extension agent. "This training gave me the tools that I need to start a conversation with someone in my local farming community, who may be struggling. It was a great chance for me to try to help."

The centers received additional support from the 2020-2021 Kentucky Legislature through an effort championed by Kentucky Rep. Brandon Reed. The legislature's allocation provided funding for 40 more QPR trainers to train an additional 300 Kentuckians in the Kentucky Rural Mental Health and Suicide Prevention pilot program. The second cohort of participants are located in counties with high



needs for these services. They live in areas with high rates of morbidity and mortality and a large number of farms.

“It is extremely rare to have support from a state legislature to address rural mental health, and we are so appreciative that our legislators have made this issue a priority,” Mazur said.

The centers are also studying the effectiveness of the trainings. In the first group of participants, UK researchers surveyed them three days before and one month after the training.

“Our findings show that the training had a statistically significant impact upon trainees. After the training, participants were twice as willing to intervene with someone who needs help,” said Carolyn Oldham, MEd, PhD, director of continuing education for the Central Appalachian Regional Education and Research Center. “In our first group of trainers, two had actually intervened with a producer within the first month after learning QPR.”

The second cohort of participants is in the midst of training. Researchers will survey this group at one month, six months and one year after they complete the program.

The researchers are also working with the Kentucky Injury Prevention and Research Center to upgrade the state’s suicide hotline so when a Kentuckian calls it, a fellow Kentuckian answers the phone. Callers to the Kentucky hotline are also asked if they are a farmer or member of a farm family, which will allow researchers to track mental health issues in rural communities.

The Southeast Center for Agricultural Health and Injury Prevention and the Central Appalachian Regional Research and Education Center are funded by the National Institute for Occupational Health and Safety and directed by Wayne Sanderson, PhD, CIH, a professor

in the UK Department of Biosystems and Agricultural Engineering. Plans are underway for the project to build on the Kentucky model and extend and expand their agricultural community-based QPR train-the-trainer model to other Southeastern states the center serves.

The center also developed a video that highlights the importance of suicide prevention education and features some participants from the first co-hort. It is available online [here](#).

| *Katie Pratt is an agricultural communications specialist in the University of Kentucky’s College of Agriculture, Food and Environment.*

