

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 Jimmy Henning, PhD, extension professor, Plant and Soil Sciences*

# WHICH GRASSES SHOULD YOU PLANT IN YOUR PASTURES?

## SEED SELECTION FOR PASTURE RENOVATION

As equestrians, we know that we must be somewhat selective of the mounts we choose. While exceptions exist, Quarter Horses tend to make better reiners than Saddlebreds, Warmbloods tend to make better jumpers than Arabians and Belgians tend to make better pullers than, well anything that isn't a draft horse. It's also no surprise that within each breed or discipline, some lines or family groups are just better at a specific skill than others. We like to think that selecting grass for our pastures is simpler, but the truth is, there are better species for different situations, and within each species, some varieties will perform better under certain conditions or geographical areas. Hopefully, this information will help you to select species and varieties of grasses for you fall planting.

### Species Selection

The biggest factor in selecting species is where in the country are you located, though use will also have some impact. Grass (and legume) species can be divided into warm season and cool season grasses. Warm seasons, such as bermudagrass and bahiagrass, thrive in warm climates, such as those found in the Deep South. Cool seasons, such as tall fescue and Kentucky bluegrass thrive best in the cooler northern regions. Kentucky and neighboring states are located in the transition zone, meaning that both warm and cool season grasses can be maintained, though cool seasons are the primary pasture grasses. Intended use can impact species selection as well and are best explained by example. The University of Kentucky Veterinary Science Department was interested in replanting a pasture that gets heavy use, but only in the summer months. For this reason, bermudagrass was recommended as it is high yielding and grazing tolerant and mainly productive in the summer months.

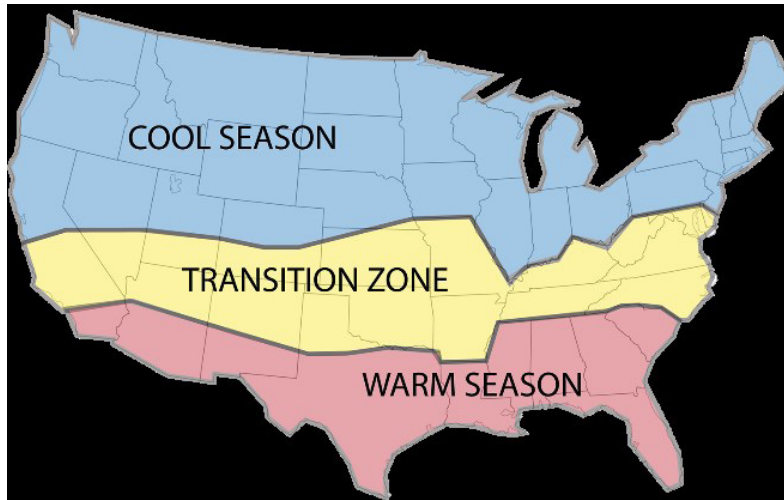


FIGURE 1: KENTUCKY AND SURROUNDING STATES ARE PART OF THE TRANSITION ZONE AND HAVE CLIMATES THAT ALLOW BOTH WARM AND COOL SEASON GRASSES TO GROW, THOUGH, FOR KENTUCKY, COOL SEASON GRASSES AND LEGUMES ARE IDEAL IN MOST SITUATIONS. GRAPHIC BY UK AG COMMUNICATIONS.

Table 1. Common horse pasture grass and legume species and some of their benefits and limitations		
Species	Benefits	Limitations
KY Bluegrass (cool season grass)	<ul style="list-style-type: none"> <li>• Thrives under close grazing</li> <li>• Early spring green-up</li> <li>• Fills in bare areas to form a dense sod</li> </ul>	<ul style="list-style-type: none"> <li>• Becomes brown and does not perform well in hot, dry conditions</li> </ul>
Tall Fescue (cool season grass)	<ul style="list-style-type: none"> <li>• Tolerates hot, dryer conditions better than most cool season grasses</li> <li>• Good yield</li> </ul>	<ul style="list-style-type: none"> <li>• Could be infected with endophyte toxic to broodmares</li> <li>• Does not thrive in shade</li> </ul>
Orchardgrass (Cool season grass)	<ul style="list-style-type: none"> <li>• Good yield and palatability</li> <li>• Establishes well into existing sod because of good shade tolerance</li> </ul>	<ul style="list-style-type: none"> <li>• Typically only survives in stand four to five years</li> <li>• Does not tolerate long periods of close grazing</li> </ul>
White Clover (cool season legume)	<ul style="list-style-type: none"> <li>• Good forage quality</li> <li>• Aggressively spreads into bare areas</li> </ul>	<ul style="list-style-type: none"> <li>• Can overtake some stands if grazed close</li> <li>• Can cause founder, colic or weight gain when present in excessive amounts</li> </ul>
Bermudagrass (warm season grass)	<ul style="list-style-type: none"> <li>• Excellent yield and persistence</li> </ul>	<ul style="list-style-type: none"> <li>• High fertilization requirements</li> <li>• No spring or fall growth</li> <li>• Limited winter survivability</li> <li>• Turns tan in winter</li> </ul>
Perennial Ryegrass (cool season grass)	<ul style="list-style-type: none"> <li>• Quick to establish</li> <li>• More forgiving during establishment with high seedling vigor</li> <li>• Excellent yield</li> </ul>	<ul style="list-style-type: none"> <li>• Limited survivability, two to three years</li> <li>• High water soluble carbohydrates</li> </ul>

In another example, small paddocks that are usually grazed hard are often seeded with perennial ryegrass for its quick germination and inexpensive cost. Perennial ryegrass typically has the highest concentrations of water-soluble carbohydrates (WSC) of the cool season grasses, so some farms with overweight and/or founder-prone horses will decide against it.

#### Variety Selection

Like selecting an equine bloodline for racing or jumping, variety selection requires a bit of research, but pays off in the end. Seed can be of two types, “commercial” are those of improved varieties with known and proven genetics or “common,” seed that has unknown parentage and performance. Common may also be listed as “variety unknown or variety not stated.” This is equivalent to a “grade” in horses. With common seed, you may be getting a great variety, or you might be getting something that didn’t perform well or is mixed up with other seed. Common seed is often cheaper, but like buying horses, you get what you pay for. For this reason, we suggest only purchasing certified seed of a known variety and one adapted to your area and use.

Many universities, including UK, perform side-by-side comparisons of varieties to measure yield and persistence. In fact, UK has one of the largest forage variety testing programs in the country. Data from the trials is published annually in a series of reports and a summary report that can be found on the UK Forage Extension website ([forages.ca.uky.edu](http://forages.ca.uky.edu)).

In Table 6 of the [2019 Timothy and Kentucky Bluegrass Report](#), you’ll find the forage variety results of a comparison of five Kentucky Bluegrass varieties seeded in the fall of 2017. In this case, Maturity and Percent Stand were quite similar for most varieties. But the yield is where the differences lie, particularly in the two-year total. Those that

have a \* after the number were not statistically different than the highest producing variety, in this case, Barderby. So Ginger performed as well as Barderby, but Balin, Park and Tirem did not. If yield is your sole focus, then one of these two would be the best variety for farms in the Lexington area. Keep in mind though this is only one test.

The [2019 Long-Term Summary of Kentucky Forage Variety Trials](#) combines data from tests from the last 30 years. Table 26 from this report shows the horse grazing tolerance of orchardgrass since 1999. For this table, the key is to look at the mean listed on the far right hand side of the table. Any number over 100 means that variety has performed better than average. The number in parenthesis tells you how many total tests that variety has been in, so give more favor to those with larger numbers because they have performed consistently over more time. For orchardgrass in Lexington, Benchmark Plus or Persist did best under horse grazing.

Choosing a proven variety backed by university data will give you confidence that you have chosen the most adapted variety available to your area and use.

#### Beware of “Horse Pasture Mixes”

Most agronomists will suggest you plant a mixture of grasses, instead of just one species. Quality mixtures are stronger because when weather and management become less favorable for one species, it likely will favor another. For example, Kentucky Bluegrass thrives in the cool, wet spring. But as conditions turn dry, tall fescue will outperform it.

It is tempting to take the easy and often cheaper option of pre-mixed “horse pasture mixes” available at many local farm stores. Before you purchase any of these, be sure to read the seed tag and see exactly what is in that mix. It could be a high quality mix, but there are too many examples that are more of a catchall of leftover

seed. These may contain high amounts of timothy, an excellent horse hay but poor pasture grass. Or they may contain common seed or varieties that have not performed well in the area. Many contain high percentages of ryegrasses, which will provide some quick cover, but won’t last. The germination percentage may be significantly lower than that of improved varieties as well. Germination percentages of 90% or higher are desired.

Many farm stores will allow you to request a custom mix, often at no additional fee, which allows you to decide what varieties of each species you want, and in what mixture. This is well worth the time and energy. Our suggested horse pasture mix for central Kentucky can be found in [Establishing Horse Pastures](#).

#### Tall Fescue

This cool season grass requires an added level of consideration. Because naturally occurring tall fescue is often infected with an endophyte toxic to broodmares and cattle, extensive research has gone into developing new, safe varieties of tall fescue. As a result, there are more varieties of tall fescue commercially available than most other grasses, and greater performance differences among them. There is also tremendous misunderstanding surrounding tall fescue varieties, so take the time to learn about each. Tall fescue can be one of three types: Endophyte free, Novel Endophyte infected or Toxic Endophyte infected. For your reference, the endophyte status of each variety is listed in the [2019 Tall Fescue and Bromegrass Report](#).

First, a bit of background on tall fescue. The endophyte is an internal fungus that was present in the original seed that was sown across most of Kentucky in the 1950s and 60s. This fungus interacts with the host tall fescue plant to produce many unique compounds, some that actually make the plant more drought and insect tolerant. But as the name ‘toxic endophyte’ suggests,

some of these compounds are detrimental to livestock, especially pregnant mares.

Toxic endophyte tall fescue may also be called “KY31,” “KY31+” or wild type tall fescue. As stated previously, this combination of plant and toxic endophyte is problematic for livestock. In general, for horses, late term broodmares are those most impacted and can experience prolonged gestation, foaling difficulties and low milk production when grazing toxic endophyte tall fescue. Early term mares can occasionally experience early term pregnancy loss. Generally speaking, stallions, geldings, growing horses and performance horses are not negatively affected by toxic endophyte tall fescue, although some physiological effects have been documented. If you do not have broodmares, you likely can tolerate this type of grass in your pastures. However, if you decide to kill out a pasture completely, go ahead and remove this from your mixture.

Traditional stands of KY31 have survived for decades, even under heavy grazing pressure, because of the presence of the toxic endophyte. However, generic KY31 seed is not monitored by either seed improvement agencies or commercial companies to ensure that the seed in the bag is actually the original KY31 genetics. Tests of generic KY 31 seed lots have found that the actual endophyte level varies considerably, and can be quite low (as low as 30%). Essentially this means that instead of getting the persistent (and toxic) tall fescue, you are actually buying endophyte free tall fescue. For this reason, if you do decide to purchase KY31 for its longevity benefits, be sure it is tested for infection before planting.

Endophyte free tall fescue was once a big deal, providing farm managers with the option to purchase tall fescue that was safe for all classes of livestock. But years later, that positive effect of the endophyte on the plant is

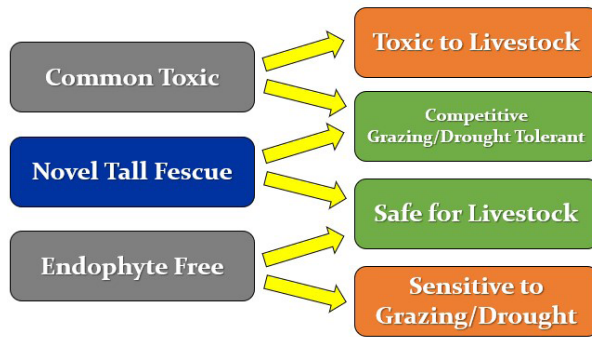


FIGURE 2. NOVEL TALL FESCUES ARE AS COMPETITIVE AND GRAZING TOLERANT AS THE COMMON TOXIC TYPE, BUT AS SAFE FOR LIVESTOCK AS THE ENDOPHYTE FREE TYPE, AND THEREFORE THE IDEAL TYPE OF TALL FESCUE TO PLANT ON HORSE FARMS.

painfully evident, as endophyte free stands rarely survive more than four to five years. Endophyte free varieties are safe for grazing, but do not have the longevity and typically will not survive long. For this reason, endophyte free varieties are not recommended.

Novel endophyte tall fescue is really the best of both worlds of persistence and lack of toxicity. This type of tall fescue contains a different endophyte, selected to give added persistence over endophyte free tall fescue but with none of the animal problems of toxic tall fescue. It may also be called a “friendly endophyte or beneficial endophyte.” The endophytes in these products were hand selected and the resulting varieties were rigorously tested for quality and safety to livestock before release. Some of this work has been done at UK, including grazing trials with pregnant mares. Because these products have had extensive research, development and testing, they are not cheap. But, if you are killing out and re-establishing a pasture, Novel endophyte tall fescue is absolutely the way to go and worth the added expense.

To ensure you are purchasing a tested and safe novel endophyte tall fescue, consider only those that have been certified by the Alliance for Grassland Renewal. This organization is a non-profit collaboration of research institutions, seed companies and universities from across the southeastern U.S., including UK. If the seed lot meets its rigorous

standards for endophyte purity and viability, it will have an additional seed tag or logo printed on the bag indicating it has been certified by the Alliance. You can learn more about the Alliance and novel tall fescue types on its website and by subscribing to its newsletter.



### Summary

Selecting the best varieties for your pastures is a simple way to improve the chances your efforts of pasture renovation are successful for years to come. Just like purchasing proven bloodlines, selecting seed of improved varieties is well worth the investment and highly recommended. For any pasture seeding or renovation, be sure to follow these six steps to increase your chances of seeding success: 1) Apply any needed lime and fertilizer amendments. 2) Use high-quality seed of an improved variety. 3) Plant enough seed at the right time. 4) Use the best seeding method available. 5) Control competition. 6) Allow the immature seedlings to become established before grazing.

| *Krista Lea, MS, coordinator of the University of Kentucky's Horse Pasture Evaluation Program, and Jimmy Henning, PhD, extension professor in the Department of Plant and Soil Sciences, provided this information.*

# COMMENTARY; COVID-19 AND HORSES

Since discovery of the novel coronavirus (SARSCoV-2), causal agent of the highly contagious and frequently life-threatening disease of humans designated COVID-19 in December 2019, the virus has spread very rapidly around the globe. The exponential increase of cases in affected countries and the alarming case-fatality rate has resulted in a pandemic of unprecedented proportions, in terms of its health and economic impact on human populations worldwide.

Of the seven coronaviruses known to infect humans, three are of major public health significance: severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS) and coronavirus 2019 (COVID-19). Other members of the coronavirus family can cause respiratory or intestinal disease in a range of domestic species, including horses, swine, cattle, cats, dogs and chickens. SARS-CoV-2 is genetically and otherwise uniquely distinct from these other coronaviruses, none of which are known to be human pathogens.

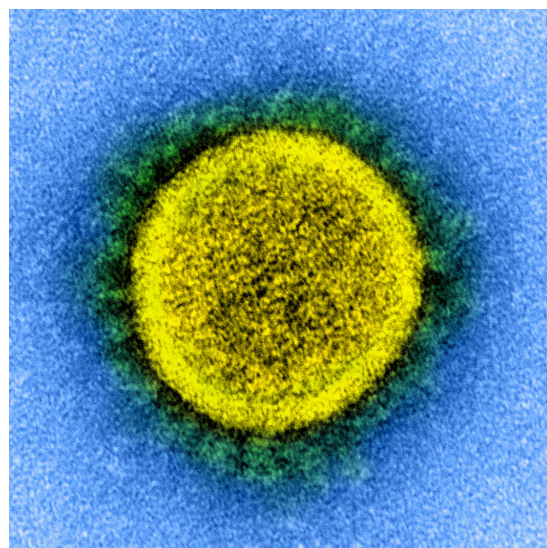
There are many aspects of the biology of SARSCoV-2, including its host range, epidemiology, pathogenesis and nature of the immune response to the virus, that remain to be fully elucidated.

The pandemic of COVID-19 has had significant implications for the U.S. horse industry. A point of continuing concern for many in the industry is whether SARS-CoV-2 is capable of infecting and perhaps causing disease in horses. At the present time, there is no evidence confirming the susceptibility of horses to infection. This is supported by the outcome of a recent study undertaken to determine conservation of the angiotensin-converting enzyme 2 (ACE2) across 410 vertebrates including 252 mammalian species, and the likelihood of it functioning as a

SARS-CoV-2 cell receptor. The horse was ranked low risk in predicted susceptibility to infection based on the binding characteristics of its ACE2 compared to the human homologue. In the current absence of any information to the contrary, it is not possible to speculate on the potential risk of horse-to-horse transmission of the virus and whether horses might play a role in transmitting the virus back to humans.

Aside from the primary consideration of its potential to affect the health of the horse, COVID-19 has had a major impact on the economy of the horse industry in Kentucky and the USA. Virtually all sectors of the industry have been negatively influenced by the current pandemic. Racing, equestrian events, and horse shows have been cancelled or postponed to a later date. Horse sales and other ancillary businesses have been similarly affected. This has inevitably resulted in layoffs or furloughing of workers who would otherwise be employed at racetracks, equine sporting events, sales, etc. The economic fallout from this pandemic also has affected people who buy horses or wager at racetracks.

Horse breeding has been allowed to take place subject to stringent precautionary measures to prevent further spread of SARS-CoV-2. This is predicated on maintaining an enhanced level of biosecurity in all aspects of breeding shed activity and in following approved standard practices including social distancing by



THE NOVEL CORONAVIRUS THAT CAUSES COVID-19.  
IMAGE: NIAID-RML.

personnel. While much attention has been focused on centers of horse racing and breeding across the country, the financial repercussions of COVID-19 have also been acutely felt by owners of smaller horse farms/businesses, etc., whose livelihoods are dependent on the sustainability of the equine industry.

It is way too soon to predict what the overall impact of the pandemic will have on the nation's equine industry in all its aspects from racing, equestrian events, horse shows, breeding, sales and a variety of ancillary businesses. What is certain, however, is that the horse industry will survive and, given time, thrive again and regain its former prominence and importance to the nation's economy.

| Peter Timoney, MVB, PhD, FRCVS, Professor, Frederick Van Lennep Chair in Equine Veterinary Science at the Gluck Equine Research Center, provided this information. Source: July 2020 *Equine Disease Quarterly*.

# UK'S GLUCK EQUINE RESEARCH FOUNDATION LOOKING TO FUTURE WITH EQUINE BIOLOGICAL PASSPORT PROGRAM



DR. SCOTT STANLEY. PHOTO COURTESY STONESTREET FARM.

The Gluck Equine Research Foundation at the University of Kentucky is developing an Equine Biological Passport (EBP) that aims to identify specific biomarkers that will detect drug use by monitoring changes to peptides and protein abundance, and monitor those biomarkers over time. The goals of this program are to elevate equine research at UK, to serve as a platform to impact policy change and drug testing protocol, and further understand the impact of drugs and medications on Thoroughbred racehorses.

“In the last few years we have seen too many negative headlines around equine drug use. As a research scientist, with 30 years of regulatory drug testing experience, my team and I know this is a problem we cannot currently solve,” said Scott Stanley, PhD, professor of analytical chemistry at the Gluck Equine Research Center and director of the Equine Analytical Chemistry Laboratory. “We know that it takes time to develop new tests for each new emerging drug,

so we will always be behind. We know that each horse metabolizes drugs at a different rate, making standard clearance and withdrawal times confusing. In addition, we know that there are environmental factors, human interactions and hundreds of other variables that can impact our current drug testing procedures. The EBP program is a tool that will enable us to rapidly identify new drugs and measure the physiological effect on the equine athlete. These data will be critical in differentiating between intentional doping and accidental contaminants, which can smear the industry image and damage reputations.”

The Equine Biological Passport program is an evolving research program, which is designed to expand and to be flexible enough to address new challenges, such as bio-therapeutics. Over the next several years, the Gluck Center will continue to validate and refine the EBP program to position it as a future tool for the industry. In addition, it will provide scientific

data needed to support changes in rules and regulations that will allow prosecution of violators, and prevent “at risk” horses from entering in competitions. “At Stonestreet we are proud of our integrity, our commitment to a level playing field and our focus on the health of the horse above all else,” said Barbara Banke. “An equine biological passport will give us a comprehensive program that provides full transparency for both competition and out-of-competition testing, for every stakeholder.

“We will contribute \$100,000 toward this project and I encourage all stakeholders to consider a tax-deductible gift as an investment in the future of the racing industry,” Banke said.

For more information about this project, visit [here](#), or contact [Stanley](#) at or 859.494.6319. Funding for this project is entirely dependent on private support. For more information on how to support this effort or to make a gift please contact [Danielle Jostes](#) at or give [online](#).

| *Source, July 20 news release by Gemma Freeman, Stonestreet Farm.*



HOVER YOUR PHONE'S CAMERA HERE TO SEE THE VIDEO ANNOUNCING THIS PROJECT.

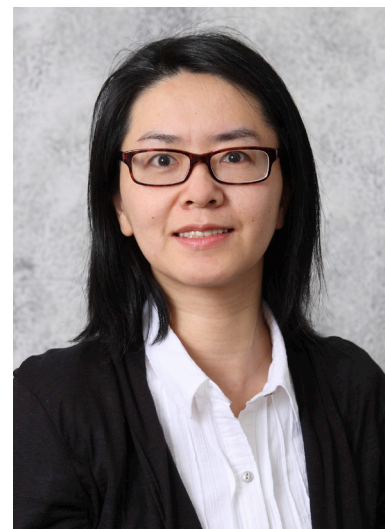
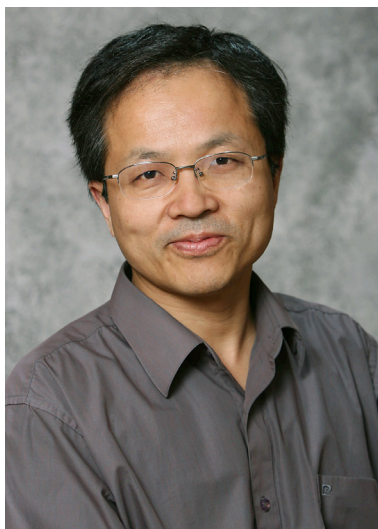
# LI AND WANG JOIN UK GLUCK CENTER'S INFECTIOUS DISEASE PROGRAM

University of Kentucky Gluck Equine Research Center recently welcomed two accomplished researchers into its infectious disease program. Feng Li has been named the William Robert Mills Chair in Equine Infectious Disease and Dan Wang joins the department as a virologist. Both Li and Wang came to UK from South Dakota State University.

"I am extremely delighted that Drs. Feng Li and Dan Wang have joined our program. Their combined expertise in viral respiratory diseases will both complement and enhance the equine infectious disease program at the Gluck Center," said David Horohov, PhD, chair of the Department of Veterinary Science, director of the Gluck Equine Research Center and Jes E. and Clementine M. Schlaikjer Endowed Chair. "I know our students, faculty and stakeholders will greatly benefit from their presence in our department."

Li, who officially started July 1, was previously a professor of biology and microbiology in the Veterinary and Biomedical Sciences departments at SDSU. He earned a veterinary degree equivalent from the Qingdao Agricultural University, formerly known as Laiyang Agricultural University in Shandong, China, and his master's degree from the Harbin Veterinary Research Institute at the China Academy of Agricultural Sciences in Harbin, China. Li then earned a doctorate at the University of Melbourne, Victoria, Australia, and completed a postdoctoral fellowship at the University of Pittsburgh.

Li's laboratory is interested in understanding, treating and preventing communicable disease caused by viral pathogens. His lab currently studies several enveloped RNA viruses that cause significant



FENG LI, LEFT, AND DAN WANG, RIGHT. PHOTOS COURTESY SOUTH DAKOTA STATE UNIVERSITY.

diseases in humans and livestock, including zoonotic influenza A virus, HIV and emerging infectious disease agents such as Zika virus and influenza D virus. His lab works to better understand the dynamics and interactions between viral pathogens and hosts, with an aim of using that information to help develop next generation vaccine and antiviral therapeutic strategies.

Past major contributions to virology include a classification change of equine rhinovirus 1 and, in conjunction with several researchers, including Charles Issel at the Gluck Center, the development of the first genetically engineered live attenuated equine infectious anemia virus vaccine, which resulted in a U.S. patent on EIA vaccine and diagnostics.

Additionally, his HIV research during his time at Panacos Pharmaceuticals resulted in discovering the first antiviral drug for equines. During his time at South Dakota State University, Li's group discovered novel zoonotic influenza viruses with bovine as a primary reservoir, resulting in a proposal to name

the group of new influenza viruses as influenza D type. The new group was recently approved by the International Committee on Taxonomy of Viruses and the virology community. His group published the first manuscript reporting evidence that the new virus may infect horses. Li currently holds a prestigious National Institutes of Health grant for his work with the influenza D virus.

"I am very pleased and honored to become a part of the infectious disease research team at the Gluck Equine Research Center. I had strong collaboration in equine infectious anemia virus with Dr. Charles Issel's group when I was a postdoctoral scientist working at University of Pittsburgh," Li said. "In more recent years, we have been collaborating with Dr. Thomas Chambers' group in equine influenza as well as the influenza D virus that we discovered in U.S. bovine and pig herds.

"Our research group is particularly interested in understanding, treating and preventing animal infectious



diseases caused by viral pathogens. We currently study several enveloped RNA viruses, including influenza and retrovirus. In the near future, we would like to develop an internationally recognized equine virology program with strong integration of both basic science and translational research, and serve the equine community to improve the health and well-being of horses,” he said.

Wang started in the department Aug. 1. She will serve as an assistant research professor with a focus on contributing to the ongoing research program in equine virology, with a primary focus on the influenza viruses.

With extensive experience in this area, Wang is expected to assist with current research programs as well as establish a new direction of research in the department. This additional expertise in virology is expected to further strengthen an already strong program.

Prior to joining the Gluck Center, Wang was an assistant research professor in the Biology

and Microbiology Department at South Dakota State University, where she also served as a postdoctoral research associate in the Health and Nutritional Sciences Department and where she earned her doctoral degree in biology and microbiology. She earned master’s degrees at both the University of Manchester in the United Kingdom and at the University of Yanbian in Jilin, China. She earned a bachelor’s degree at the Nanjing Agricultural University in China.

Wang’s research interests are in the areas of influenza viruses, porcine coronavirus and HIV maturation inhibitors.

“I am very thrilled to join the world-renowned Gluck Equine Research Center that has a top-notch research team in equine infectious diseases,” Wang said. “Their unique approach in forming partnerships with industry to develop solutions and improve equine health is very appealing to me.

“My research interest lies in emerging viral diseases in animals, especially those caused

by enveloped RNA viruses such as influenza and coronaviruses, and the development of effective countermeasures. I am looking forward to working with Gluck colleagues and industry partners in the area of emerging equine viral diseases,” she said.

The mission of the Gluck Center is scientific discovery, education and dissemination of knowledge for the benefit of the health and well-being of horses. Gluck Center faculty conduct equine research in seven targeted areas: genetics and genomics, immunology, infectious diseases, musculoskeletal science, parasitology, pharmacology, therapeutics and toxicology, and reproductive health. The Gluck Equine Research Center, a [UK Ag Equine Program](#), is part of the [Department of Veterinary Science](#) in the [College of Agriculture, Food and Environment](#) at the University of Kentucky.

| *Holly Wiemers, MA, APR is the communications and managing director for UK Ag Equine Programs.*

## AAEP’S EQUINE DISEASE COMMUNICATION CENTER ALERT; POTOMAC HORSE FEVER IN KY

### Potomac Horse Fever

Adair, Bourbon Shelby and Fayette County, Kentucky

Alert ID: 1745

August 13, 2020

Confirmed Case(s): No Quarantine

Source: Kentucky Department of Agriculture

Number Confirmed:10



Notes: The Kentucky Department of Agriculture has confirmed 10 cases of Potomac Horse Fever in the past several weeks. One case each in Adair and Shelby Counties, three cases in Bourbon County, five in Fayette County with note that one of the Fayette cases was a horse brought over from Indiana for treatment. Of the 10 cases, eight are reported as having survived the infection with the remaining two cases reported as deceased. Symptoms seen include elevated fevers, varying degrees of diarrhea, dehydration and low white cell counts.

<https://equinediseasecc.org/alerts>

# SCIENCE SLEUTHS: THE SCIENCE THAT SHAPES DIAGNOSTIC TESTS

## WHAT DOES ‘STATISTICALLY SIGNIFICANT’ ACTUALLY MEAN?

You’ve most likely heard or read the term “statistically significant” numerous times in your life. What does that actually mean and how do we determine if something is significant or not?

In the most basic form, statistically significant means something that is not due to random variability (not attributed to chance).

If we want to get technical, statistical significance is all about the determination of the null hypothesis. The null hypothesis is the hypothesis that there is no significant difference between specified populations, any observed difference is due to sampling or experimental error. By performing hypothesis testing, you get a result known as the p-value, which is the probability of observing extreme results in the data you have collected. A p-value of 5% or lower is typically considered to be statistically significant.

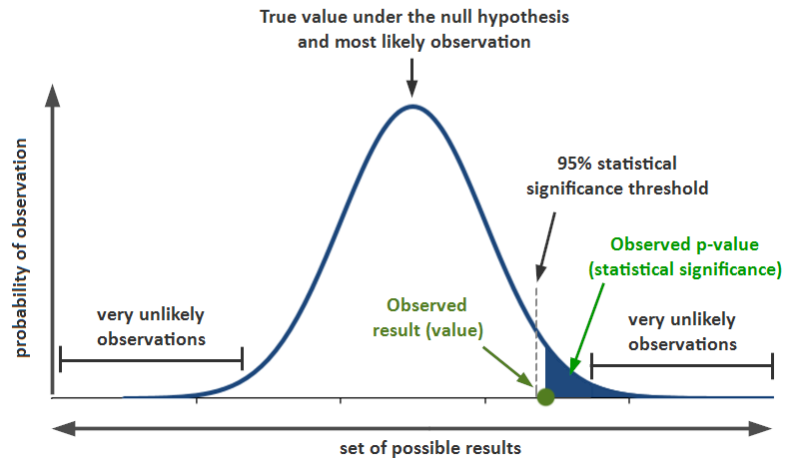
### What does this mean for the veterinary and horse communities?

By measuring the relationship between multiple variables (i.e. new diet vs. standard diet, vaccine vs. no vaccine, etc.), this allows us to establish the likelihood that an outcome is caused by what we are studying instead of just randomly happening. This means we can determine if something is actually working better than leaving things alone. Nutritionists do this all the time when testing new rations; pharmaceutical companies do this when testing new drugs or vaccines. Veterinarians, and more likely research scientists, may use this to determine if a new type of surgery or expensive treatment is worthwhile.

### How does it work?

While knowing how to perform these tests is important for researchers, from a practical standpoint remember two important factors: sampling error and

### Probability & Statistical Significance Explained



GRAPHIC COURTESY DR. JACKIE SMITH.

probability. There is always the possibility that differences you see when measuring a sample are just the result of random variability (“background noise”) or just dumb luck. This is sampling error. Probability is just that, the likelihood of something actually happening. The higher the probability of a specific event or outcome, the more likely it is to happen. However, remember that while you may have a high probability, you cannot guarantee certainty.

The use of a p-value of 5%, written as  $p < 0.05$ , the most commonly chosen value, means we are looking at a 5% likelihood of something happening by chance alone (i.e. a one in 20 chance of that being the result). That means that whatever we are looking at statistically, the results are 95% due to what we are testing, be that a new drug, vaccine, treatment or surgery.

### The take home message.

Once testing and analysis are complete, a p-value that is low indicates a statistically significant difference. However, that does not

mean the difference will automatically be important or useful. For practical significance (i.e. noteworthy), we need to determine if the difference is large enough to actually be meaningful. A relatively large difference would be useful and practical. A small difference might not be worth the effort or cost for only a small impact. This can cause issues with regard to the interpretation of results and what decisions to make based on the data. We will be discussing these issues and concerns in future stories in this publication, so watch for our future articles.

| Jackie Smith, MSc, PhD, MACE, Dipl AVES, is an epidemiologist based at the UK Veterinary Diagnostic Lab. Emma Adam, DVM, PhD, DACVIM, DACVS, based at UK’s Gluck Center and Veterinary Diagnostic Lab, is responsible for research and serves as veterinary industry liaison.

# ASIAN LONGHORNED TICK FOUND IN KENTUCKY

The Asian longhorned tick, which preys on a variety of hosts including humans and wild and domestic animals, has been found in Kentucky. This new tick is known to attack animals in large numbers and will be a concern to livestock producers, wildlife enthusiasts and pet owners.

“This tick is an aggressive biter and frequently builds intense infestations on domestic hosts that can cause stress, reduced growth and severe blood loss,” said Jonathan Larson, PhD, UK extension entomologist in the College of Agriculture, Food and Environment. “One reason for their rapid buildup is that the female ticks can lay eggs without mating. It only takes a single fed female tick to create a population of ticks. Potentially, thousands can be found on an animal.”

The tick has been found in small numbers on elk in Martin County and black bear in Floyd County. It was found in large numbers on a bull in Metcalfe County in the south-central part of the state.

“The Metcalfe County ticks were submitted by a veterinarian who answered a call about a bull so infested that it was showing signs of severe fatigue,” said Anna Pasternak, UK entomology graduate student who manages the Kentucky Tick Surveillance Program. “The tick samples that the veterinarian submitted for identification to the UK Veterinary Diagnostic Laboratory contained Asian longhorned ticks.”

Pasternak and Monica Cipriani, a student in the UK College of Public Health, sampled the Metcalfe County field and found more Asian longhorned ticks.

“With the first two findings being in Eastern Kentucky, the

Metcalfe County finding is particularly troubling as it means the tick may have already spread farther across the state,” Pasternak said.

A native of Asia, the tick was first found in 2017 in the United States. In addition to Kentucky, it has been confirmed in Arkansas, Delaware, Connecticut, Maryland, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Tennessee and West Virginia. In addition to cattle, black bear and elk, it preys on deer, raccoons, opossums, cats, dogs, coyotes, foxes, sheep, goats, groundhogs, horses, Canada geese, chickens, cottontail rabbits, red-tailed hawks and skunks. As it gets further established in the state, the tick is expected to have adverse effects on the state’s deer and wildlife population. Humans also are a host.

**Individuals who find a usually large number of ticks on their pet or livestock should contact their local veterinarian.**

The tick is small and reddish-brown with no distinctive markings to make it easy to identify. Making detection more difficult, unfed Asian longhorned adults are smaller than other common adult ticks found in Kentucky. It is also a known or suspected vector of several important livestock viral, bacterial and protozoan agents. Scientists are conducting tests on ticks collected in the United States, and it is likely that some ticks will contain germs that can be harmful to animals.

Individuals who find a usually



THE ASIAN LONGHORNED TICK WILL ATTACK WILD AND DOMESTIC ANIMALS AND HUMANS. PHOTO COURTESY ANNA PASTERNAK, UK ENTOMOLOGY GRADUATE STUDENT.

large number of ticks on their pet or livestock should contact their local veterinarian. Those who find single ticks they think might be an Asian longhorned tick should work with their county extension agent for agriculture and natural resources to submit the sample to UK entomologists for positive identification.

Additional information on tick bite prevention and proper tick removal is available in UK entomology’s ENTFACT 618: Ticks and Disease in Kentucky. It is available online at <https://entomology.ca.uky.edu/ef618> or by contacting a local extension office.

*| Source: July 21, 2020 College of Agriculture, Food and Environment news release. Katie Pratt is an agricultural communications specialist in UK’s College of Agriculture, Food and Environment.*

## UK GLUCK CENTER'S HOSSAM EL-SHEIKH ALI AND CARLEIGH FEDORKA WIN PRESTIGIOUS AWARDS



DR. HOSSAM EL-SHEIKH ALI, LEFT, AND DR. CARLEIGH FEDORKA, RIGHT.  
PHOTOS COURTESY UK COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT.

The University of Kentucky Gluck Equine Research Center had a very strong presence at the Annual Society of Theriogenology Conference, which began virtually July 23.

Hossam El-Sheikh Ali, PhD, won the Dr. Jerry Rains Memorial Abstract Competition for the best presentation with “Transcriptomic analysis of equine chorioallantois reveals key regulators and pathways involved in ascending placentitis.”

Carleigh Fedorka, PhD, was second with “The effect of mycobacterium cell wall fraction on histological, immunological and clinical parameters of equine postpartum involution.” More information about the conference can be found [here](#).



Gluck Equine Research Center  
College of Agriculture, Food and Environment

## Forage Timely Tips:

- Do NOT graze cool-season pastures closer than 3 to 4 inches. This will help conserve soil moisture and prevent overheating of the crowns.
- If drought conditions limit pasture growth, close off pastures and feed hay in a sacrifice area.
- Graze warm season annuals or perennials to allow cool season grasses to recover and to avoid endophyte-infected fescue.
- After the first good rain in August, seed winter annuals (such as small grains, rye-grass, crimson clover and brassicas) for late fall and early spring grazing.
- Plant alfalfa after the first good rain in August to allow sufficient size going into winter and reduce potential for sclerotinia damage.
- Consider renovation of cool-season grass pastures that have thinned.

*Source: University of  
Kentucky Forage News,  
July 31, 2020*

# GRADUATE STUDENT SPOTLIGHT: JENNIFER CAIN

*In late July, I had the opportunity to speak with Jennifer Cain, a doctoral candidate in the parasitology laboratory of Martin Nielsen, DVM, PhD, in the University of Kentucky Department of Veterinary Science at the Gluck Equine Research Center, about her work as a graduate research assistant and her career plans.*

*Before joining the parasitology lab, Cain already had a rich work history. She worked in the Kentucky State Police Forensics Labs as a forensic biologist and served in the U.S. Army as a public health official, including a posting to South Korea. She has published two research papers in peer-reviewed journals, given multiple presentations and received funding for a pilot study from the National Center for Veterinary Parasitology. Cain and her husband own a 25-acre farm near Danville, Kentucky, where she keeps her two Off-The-Track-Thoroughbreds. She has two mares, a gray mare named Sterling, who she shows in jumpers and dressage, and a new project mare, Cecilia, who is going to be a hunter.*

**Can you describe your main responsibilities in the parasitology lab?**

I help oversee and mentor undergraduate research projects, write grants and publications, attend and present at research conferences, help collect samples and work with horses at the research farm and work on my own research. I just had one paper published and two more that I am working on, as well as three grants that are being submitted this summer/fall. My main project, which is my dissertation project, is focused on the microbiome of the equine roundworm,

*Parascaris* spp. Currently, I am characterizing the microbiome of female and male parasite gonad and intestine. I plan to do the same for the whole organism microbiome at different life stages, as well as some in vitro drug studies to see how anthelmintics and antibiotics affect parasite viability and their microbiome, and how those two things correlate. The goal is to determine if there are any bacteria that may be important for parasite survival, and therefore potential drug targets.

**What interested you in this area of research? How did you get the opportunity to work for Dr. Nielsen?**

My master's degree was through a distance program while I was in the U.S. Army and stationed at Fort Polk, Louisiana. I chose to do a research project as part of my program, and since there is a large population of feral horses at Fort Polk, I figured they would make great candidates for research. The base veterinarian, Katie Jarisch, DVM, helped me come up with a parasitology project that would allow me to collect good data without having to come into contact with the horses. I spent a few months staring at these feral horses and collecting their feces for the project, and in the process of developing the project and writing the paper for it, I cited a large amount of Dr. Nielsen's papers. I knew I wanted to get my Ph.D. at UK because I've wanted to live in Lexington my entire life, so I started contacting people in the biology department as well as forestry due to an interest in wildlife biology. I was directed to



PHOTO COURTESY JENNIFER CAIN.

Gluck and Dr. Nielsen, although I was not very confident that I would be accepted. I emailed Dr. Nielsen and we chatted on the phone, and he said he would be happy to have me in his lab. The rest is history!

**How would you describe the lab? What are you most proud of?**

We have a fantastic lab family. We take a large number of undergraduates to help with lab work and also provide many opportunities for people to do their own projects. Many of them have ended up with publications. That is something I never had a chance to do as an undergraduate, and I think it's really great that we give people those opportunities. Dr. Nielsen makes all of this possible. He is a fantastic mentor and has created a great lab environment that develops wonderful scientists, with a sprinkling of fun.

**What equine parasite worries you the most? Why?**



PHOTO COURTESY JENNIFER CAIN.

I would not necessarily say that any equine parasite in particular worries me – I use strategic deworming practices for my two mares at home and otherwise am not concerned about parasites. The most pathogenic parasites of horses, however, is *Strongylus vulgaris*, a large strongyle. While it has been essentially eliminated from domestic horses due to the efficacy of ivermectin and early treatment practices targeting it in particular, there are still reservoirs of this parasite. Domestic horses that are not treated, such as our research herd, may have this parasite, as well as feral horses, such as those at Fort Polk. Feral horses that are adopted out could be of particular concern because they may shed *S. vulgaris* eggs on pasture, which is why it is important to include parasite concerns in quarantine procedures overseen by a veterinarian when introducing feral horses into domestic herds.

#### What do you think most horse owners get wrong about parasites?

That they are these big scary monsters out to kill their horses and must be eliminated at all costs. Cyathostomins are found in horses worldwide, and are mild pathogens that only cause clinical disease when burdens are high, so the goal of management programs is just that – management, rather than elimination.

#### What developments or changes do you see in the coming years for deworming protocols? Do you think people will deworm more effectively? Will better/different dewormers be available?

Well, I'm hoping that we see people move more toward management programs that use fecal egg counts and reduce the number of anthelmintic treatments used. Essentially, I hope people follow the [American Association of Equine Practitioners guidelines](#). This is how we will preserve currently effective anthelmintics for as long as possible, and how horse owners can ensure they are using products that are still effective. We certainly hope that

new products will be available, because the situation right now regarding drug efficacy and anthelmintic resistance is not great.

#### What parts of your job do you love? What do you like least?

I love the variety. We have a lab that is focused on equine parasites, but we do many different types of projects revolving around them, from basic biology to immunology to gene expression and beyond. I think it is very beneficial to have the exposure to a variety of different fields despite being heavily focused on only a few groups of equine-specific parasites. The back end of the horses is the part that I like the least!

#### Do you get to do a lot of fieldwork?

Yes! We work with our research horses weekly. We have a herd of mixed-breed full-size horses that have not been dewormed since 1979, and a herd of miniature horses whose parasites are double-drug resistant.

#### Once you've completed your Ph.D., what do you hope to do?

I've discovered a passion for scientific writing and editing in



PHOTO COURTESY JENNIFER CAIN.

particular. I hope to make a career out of it.

UK is a land-grant university. What part of the three missions (academics, research, Extension) do you actively work on? Are you looking forward to writing, research, teaching, outreach or perhaps a combination?

Research and extension services are our main focuses. Naturally, my Ph.D. is focused on research, but we also do a lot of outreach work in our lab. We go to some of the large Thoroughbred farms in the area and talk to them about their parasite control programs, which has led to some really amazing opportunities to talk to well-known people in the Thoroughbred industry, as well as meeting some famous horses.

What are some of your plans for the next year, either in the lab/school, with your horse and/or personally?

Next year I will be attending the American Association of Veterinary Parasitologists conference in Lexington, the World Association for the Advancement of Veterinary Parasitology conference in Dublin, Ireland, and the Equine Infectious Diseases conference in Normandy, France.

I plan on showing Sterling in the 2'6" – 2'9" jumpers, and Cecilia in the green horse hunter cross rails. Hopefully we will do well at TIP Championships!

| Karin Pekarchik, MS, senior extension associate for distance learning and founder of the UK Female Equestrian Health and Wellness Community of Practice, provided this information.

## WATCH FOR BLISTER BEETLES IN HAY



THE RED HEADED BLISTER BEETLE (LEFT) AND MARGINED BLISTER BEETLE (RIGHT) ARE COMMON SPECIES IN KENTUCKY.  
SOURCE: UK COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT.

Blister beetles are sometimes found in mid-summer cuttings of alfalfa hay and can be toxic if consumed by livestock, especially horses. As few as five to 10 of these beetles can be fatal to horses when ingested because of the cantharidin in their hemolymph (insect blood).

Management to minimize blister beetle problems in alfalfa:

- Cut alfalfa at 10% or less bloom
- Manage weeds in and around fields, especially pastures
- Consider cropping practices adjacent to alfalfa. Blister beetles can be abundant in soybeans but are usually absent in corn.
- Do not grow solanaceous crops near alfalfa – both black and stripped blister beetles can be abundant in tomatoes and potatoes
- Sample field margins before cutting – blister beetles usually come from field margins and do not tend to move too far beyond the edges of alfalfa fields
- Monitor pastures for grasshoppers. Several blister beetle species develop in grasshopper egg pods. A high grasshopper population can produce high blister beetle numbers the following year.

*Ric Bessin, PhD, extension professor; and Lee Townsend, PhD, emeritus extension professor; both from the Department of Entomology, provided this information. Excerpted from Kentucky Pest News. Source: July 31, 2020, Kentucky Forage News.*

# UK'S KATHY SHEPPARD-JONES PUBLISHES BOOK HIGHLIGHTING DIVERSITY AND INCLUSION FOR KENTUCKY KIDS

University of Kentucky [Human Development Institute \(HDI\)](#) Executive Director Kathy Sheppard-Jones has turned her personal experiences into a learning opportunity for Kentucky kids. Sheppard-Jones has published "[You Can Do So Many Things!](#)" — a book for young children that highlights diversity and inclusion in the workforce.

"There are a lot of messages in the book about opportunity. We tried to include themes about work and diversity of life experience," Sheppard-Jones said. "We want families and children at a very young age to think of the world as theirs to explore, and that there are many paths and possibilities for everyone."

Through the book, children can follow along with the main character, Flynn, who has a mobility impairment. She explores various places related to the horse industry in Lexington, Kentucky. The book introduces its readers to the world of horses and possibilities for young children as they consider future work opportunities. "You Can Do So Many Things!" celebrates the horse industry in Kentucky's Bluegrass and the many possibilities for employment. Given that 1 in 3 Kentuckians experiences disability, and people with disabilities face employment barriers, this book also offers a different approach to understanding disability.



HDI EXECUTIVE DIRECTOR KATHY SHEPPARD-JONES TURNED HER PERSONAL EXPERIENCES INTO A LEARNING OPPORTUNITY FOR KENTUCKY'S KIDS.



It is written for young readers, to encourage them — starting at very young ages — to think broadly about possible work in the horse industry. Over a dozen different career paths are highlighted in the book, as well as all different kinds of disabilities and different horse breeds. "You Can Do So Many Things!" also highlights local employers including the University of Kentucky, Kentucky Horse Park, Keeneland and Hallway Feeds.

"I was the horse crazy child growing up who was told my disability would not allow me to do what I wanted to do," Sheppard-Jones said. "So, I dedicated my life to help people with disabilities get jobs. I got to share my love of Lexington, horses and connecting people with real work. The book is my love letter to Lexington and the opportunities here."

The book is currently available as an accessible online PDF that includes an audio reading of the book, to allow different ways for kids to interact with the literature. Soft and hard cover copies will be available through the HDI online bookstore, and

copies will be provided to child care centers around the state. "We want to make this book accessible and available to children throughout Kentucky," Sheppard-Jones said. "Ultimately, we want children and families to have high expectations and to be thinking about the future. Work matters. I want to broaden peoples' understanding of what is possible. Once you find the spark you can hone in on what aspects of a particular career path is most appealing."

"A special thank you to my editor, Caroline Gooden (an adjunct faculty member in UK College of Education), and illustrator, Brittany Granville. Brittany's talents really brought the book to life. The style and warmth of the images help the story gallop across the pages."

Development of the book project and the first set of books was supported through UK HDI's Fund for Excellence.

| *Meg Mills is a member of the University of Kentucky PR and Marketing news bureau staff. Source: UK Now, Aug. 3, 2020.*



# UNDERGRAD RESEARCH PROJECT STUDIES HORSES' INCLINATION TO SEEK SHADE AT CERTAIN TEMPERATURES

When COVID-19 upended her internship plans, Lauren Underwood, undergraduate equine senior at the University of Kentucky, abruptly changed her focus and instead took an independent research project on the road to Texas. Working under Camie Heleski, senior lecturer within the equine undergraduate degree program, Underwood began a quest to learn more about horses' desire for shade when temperatures go higher than 85 degrees Fahrenheit and in the process not only fulfilled her internship requirement, but also discovered a passion for research.

With Heleski's help, a new door was opened for Underwood in research in her home state of Texas.

During her project, Underwood visited 126 farms and observed the 1,099 horses that lived on those farms. She recorded the behavior of the horses during varying temperatures. She was most interested in learning if they would seek shade in temperatures over 85 degrees Fahrenheit.

Heleski had previously conducted this research in primarily northern states, but never as far south as Texas, where the heat index is substantially higher. Underwood was interested in replicating Heleski's research in Texas.

Over the course of her project, Underwood visited nine different counties in northern Texas and drove more than 3,000 miles. In that time, she captured 276 behavioral observations in her data collection sheet.

Underwood found, in conjunction with Heleski's earlier work, that the driving force behind horses

seeking shade has to do with the UV Index's effect on the particular horse in question. She determined that horses seek shade according to the "feels-like" temperature instead of the actual recorded temperature one might see on a weather app.

"I had the wonderfully good fortune to work with Lauren this summer on this project," Heleski said. "The hypothesis at the outset was that as temperatures increase above 85 degrees Fahrenheit, horses will have an increasing motivation to seek shade, whether from trees or human made shelters.

"Though more careful statistical analysis is still needed, it did appear that as temperatures increased, a higher percentages of horses would seek shade. This was especially true on bright sunshine/high UV days," Heleski said.

Underwood also noted that when horses had a choice, most would seek out shade from trees more often than shade from human made shelters. Herd dynamics appeared to play an important role in when a given group of horses might move toward shade seeking.

"Shade inside the shelter or under trees may not be any cooler than in full sunlight, because the



POSING WITH MARES FROM SDP BUFFALO RANCH, FORT WORTH, TEXAS. PHOTO COURTESY LAUREN UNDERWOOD.

'feels like' temperature is the same temperature in shade. Shelters do however, provide cover to block out sunrays from burning skin or bleaching out their coats," Underwood said.

According to Underwood, the opportunity to conduct research as an undergraduate was an amazing experience, and one that set her future course.

"I feel like people go on to graduate school and haven't experienced this," she said. "So if you wait to figure out that, 'Oh this isn't for me,' then you've already wasted money and time on it. If you've never done it, you just don't know. And then if you have done it, you can say, 'Okay this is like a vegetable, do I like it or do I not?'" and then you can decide whether to pursue it further. It

### Description of Responsibilities and Activities

Time management and organization is the key to be successful as an intern.

**EQM 399:**

- Turn in assignments on time and meet deadlines.
- Sign COVID-19 contract.
- Log hours performed on Canvas.
- Prepare poster for showcase.

**Dr. Heleski:**

- For my research project I had weekly check-ins via email and Zoom to submit my data that far and discuss any issues or discoveries that I observed.
- Created a spreadsheet of study site locations.
- 125 farmhouses in 5 counties in North Texas visited.
- Developed a methodology for the study.
- Monitored weather temperatures for the days over 85F and above.
- Used iPhone weather App and by weather broadcasts to determine time of arrival and where to go to make observations.
- Mapped out driving route using MapQuest.
- 3,104 miles traveled on 19 observation days.
- Collected data observations.
- Used data collection sheet and used iPhone to take pictures.
- Met with barn owners to stay longer on the property.
- Recorded 276 daily observations onto master spreadsheet.
- Organized the data.
- Created data tables and graphs to quantify findings.
- Analyze Data and findings into a PPT presentation.
- Make final presentation to share research learnings and insights.

### Abstract

This semester I had the pleasure to collaborate with Dr. Camie Heleski on a remote internship research study examining how equine seek shade when temperatures are 85F degrees or higher. Previous studies did not examine equine shade seeking behaviors at temperatures above 85F degrees. And new data, have been conducted in the state of Texas. In total, I visited 126 farmhouses within 9 Texas counties, and drove 3,104 miles to document 1,299 horses and 46 livestock species as they sought shade.

To collect the data, I traveled to 126 farms in the North Texas area where I observed horses in their pastures as they sought shade under human-made shelters or natural shelters such as trees. At each place I recorded the temperature, wind speed, humidity, UV index, field like temperature, and took note of the horses were harassed by flies.

A total of 276 observations were made during the study period of May 27-July 10, 2020. Findings suggest that equine do indeed seek shade when the "feels like" temperature is above 85F, regardless of the actual temperature. In fact, data suggests that temperatures of 85F, horses sought shade 50% of the time, and 100% of the time when the actual temperature was 95F or higher. When the "feels like" temperature is 90F or higher, horses sought shade 100% of the time even though the actual temperature was only 85F. Horses seek shade primarily under trees or shelters. This information will be beneficial to improve the general welfare of horses.

To learn more about my research process:  
Click below to access the PPT summary of my study and research.

### Evaluation of EQM Courses

**EQM 340 Facility and Design**

In this course Dr. Coleman discussed the key design concepts required to build a barn or facility. I learned how to create the business proposal and construct plans for my "future" barn that I will build one day. In this class I gained new skills and now I understand to the difference between various "shelters" in the pasture.

**VS 307 Horse Genetics**

Dr. Bailey taught the different attributes of genetics for horses, colors, conformation, bloodlines, modifications, etc. In his class I really learned the genetic code to be able to determine color of horses for data collection.

**EQM 305 Equine Industry Issues**

In Dr. Heleski's class I really got exposure to different industry disciplines and the way of life in their eyes. I felt that from this class alone, I gained the confidence to be able to talk to different farms about their protocols and still represent the University of Kentucky with professionalism.



### Professional Growth Goals

Create an outline of what is necessary to do a research internship by May 2020  
Strategies: Communicate with Dr. Heleski via Zoom or email periodically to receive help, mentoring, and provide feedback. Develop and implement a routine to follow for independent research. Gather any useful tools, books, to help with the research.

Provide a portfolio of the research collection thus far by August 2020  
Strategies: Start laying out the excel sheets and research papers provided by Dr. Heleski and then put together a small synopsis to be used as a tool for Dr. Heleski's study.

Gradually take the experience and knowledge to future endeavors in the Equine Industry by December 2020  
Strategies: Graduate from the University of Kentucky with a Bachelors degree. Take the knowledge and skills from this research study to help further my endeavors in Grad School.

### Professional Growth Outcomes

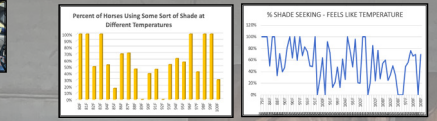
Contribute findings to Dr. Heleski's Equine Shade Seeking Behavior research study and publication as an Undergraduate.

- My goal this Fall, is to remain on the research study and to participate in the abstract virtual conference.
- As a result of my internship accomplishments, I applied for a Teaching Assistant (TA) position to be the TA for Dr. Heleski's EQM 305 class in the Fall.

Apply for admission to Graduate School with a concentration in Horse Genetics research.

- Identified nine grad school possibilities. Reach out to professors from those schools who may have openings in their research program and discuss prerequisite requirements.
- My research experience on the Shade Seeking Behavior study and working as a TA will make my application more competitive.
- Study for the GRE test so that I can score phenomenally well on the exam. Secure my spot in the Animal Science Graduate Program.

Graduate from the University of Kentucky with a Bachelor of Science in Equine Science and Management Degree Fall 2020.  
Enter Graduate school in Spring 2021!



### Project Development

How the Remote Study was conducted:

- Map out the Plan:
  - Where to go? Who to visit? How to monitor the weather?
- Interim during COVID-19 Considerations:
  - Several farms closed their gates or had limited access.
  - Masking are REQUIRED at several farms.
- Multitask (Safety):
  - Be able to record data in collect sheets and able to drive safely. Several times having to pull over to record data and drive again. Used camera phone to document observations.
- Organize the Data:
  - Created a data spreadsheet.
  - Created spreadsheet of collection sites (listing of facilities)
  - Created data worksheets: Feels Like Temp, UV Index, Wind speed, and Humidity
- Utilize Available Resources/Supplies for Research:
  - Communicate using shared resources for location: Zoom Calls, Email, One Drive.
  - Strong Excel/Statistics skills (AEC 300 and STA 210)
  - Camie's Phone provided time stamp of location (Apple IOS)
  - Equine Tapestry by Lesli Kuhnman to identify colors.
  - MapQuest for Routes, AMFM Temperature to decide plan of action.
  - Driving: Make Appointments for farms.
- Behave as UNK Ambassador:
  - Have experience with horses and livestock.
  - Build Network Connections.
  - Job/Future Internship Possibilities.
  - Create Repeatable Relationships with several Equine Industry Partners.



### Acknowledgements

Special thanks to following farms in North Texas:

- Alpha Equine Granbury, TX
- SDP Buffalo Ranch Fort Worth, TX
- Iron Horse Ranch Granbury, TX
- Weatherford Equine Breeding and Medicine Weatherford, TX

Special thanks to the following Professors at the University of Kentucky:

- Dr. Earnest Bailey: On the first day of class always having a smile in lectures even when the topics become tricky. Giving horse genetics a whole new light which inspired my future interest to pursue in Grad School.
- Dr. Bob Coleman: Opening my eyes to different parts of the Equine Industry in Tools and Tack class. Materializing the business plan for my future farm from the EQM 340 Facility and Design class.
- Dr. Camie Heleski: Giving me the opportunity of a lifetime to conduct a research study as an intern.
- Dr. Mary Rossano: Starting from the very beginning as your advisor, you encouraged me to follow the pathway to success and to pursue my future endeavors. Always giving me the resources and personal knowledge to realize my dream!

UNDERWOOD'S INTERNSHIP POSTER FROM HER PROJECT. COURTESY LAUREN UNDERWOOD.

helps to know that you are being a mini-scientist. When it's something you're interested and you care about, it makes a difference."

She said she felt that it can be intimidating for students to travel this path because of the sheer amount of people they have to put themselves in front of.

Underwood said she got through this initial fear with a quote from the 2011 film, *We Bought A Zoo*, "You know, sometimes all you need is 20 seconds of insane courage, just literally 20 seconds of embarrassing bravery, and I promise you something great will come of it."

"When I was pulling up to these farms, I think it's always intimidating meeting someone you have never met before. I would just tell myself, 'I have 20 seconds, like 10 to open the door and 10 to start talking,' and that would help me get through it."

For Underwood, the research she did opened up new doors for

her and let her explore what she wanted to do after she graduates this fall.

Her undergraduate research with Heleski will continue during the fall semester and she is excited with the newfound option of pursuing research as a future career.

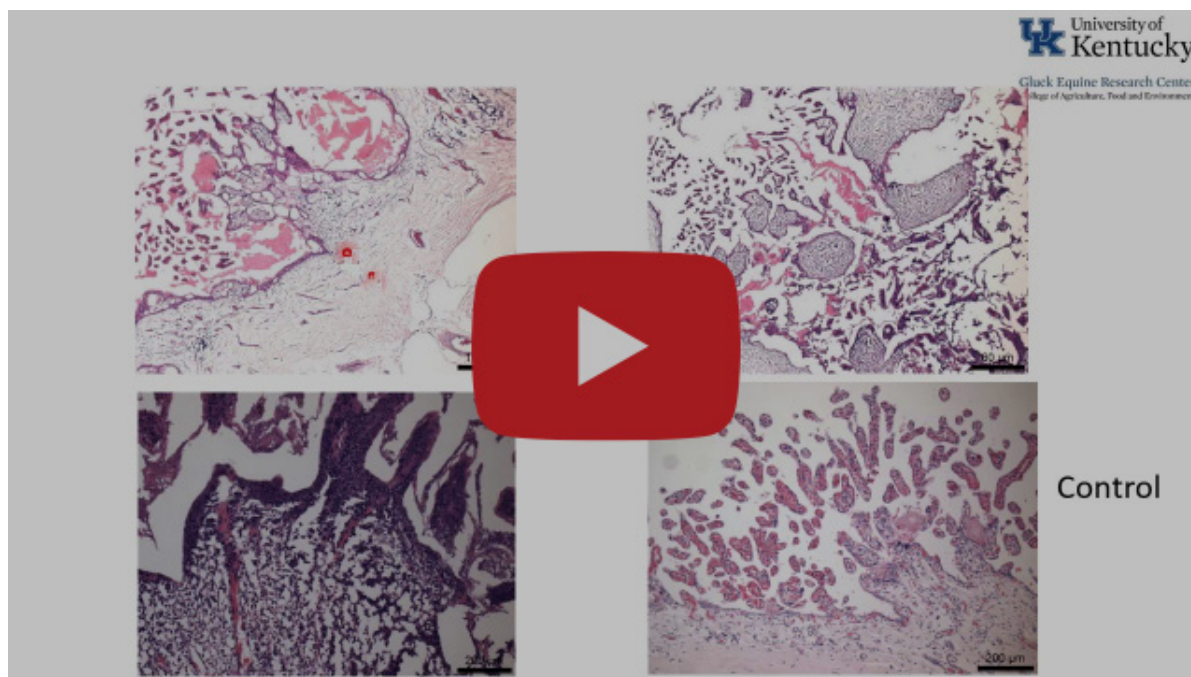
Her suggestion for students interested in undergraduate research? "Go for it my friends!"

*| Sabrina Jacobs, a senior majoring in equine science and management and minor in wildlife biology and management, is a communications and student relations intern with UK Ag Equine Programs.*



UNDERWOOD POSES WITH DR. MELANIE RITTER, ALPHA EQUINE, GRANBURY, TEXAS. PHOTO COURTESY LAUREN UNDERWOOD.

# UPDATE ON NOCARDIOFORM PLACENTITIS



## UK IN THE NEWS

### **Can Diet Make a Horse ‘Crazy’?**

Drs. Jenny Biehunko and Camie Heleski touch on how nutrition might or might not affect horse behavior. From learning theory and counterconditioning to supplements and pharmaceutical options, we'll take a look at ways to safely help nervous, high-strung, and energetic horses relax. Listen to the full recording [here](#).

*Source: The Horse.com, July 26, 2020*

### **Horse Trainer or Behaviorist: What's the Difference?**

Drs. Camie Heleski and Jenny Biehunko explain the differences between a horse trainer, an animal behaviorist and a veterinary behaviorist. Listen to the full recording [here](#).

*Source: The Horse.com, July 23, 2020*