

Kentucky Necropsy Program Disproves 'Bad Step' Myth



Many racehorses that suffer catastrophic injuries have pre-existing conditions that lead to breakdowns.

ANNE M. EBERHARDT

The Kentucky Horse Racing Commission (KHRC) necropsy program is continuing to provide evidence that many racehorses that suffer catastrophic injuries often have pre-existing conditions that lead to breakdowns.

An Oct. 20 symposium on "Racetrack Injury Prevention," held at the University of Kentucky (UK) Veterinary Diagnostic Laboratory, in Lexington, as part of the college's Department of Veterinary Science seminar series, shed more light on the subject. The KHRC necropsy program was launched in 2009 and is overseen by KHRC equine medical director Mary Scollay-Ward, DVM.

During the Welfare of the Racehorse Summit held earlier this year in Lexington, Scollay addressed what she called the myth of the "bad step" in regard to the breakdown of horses in racing and training. At the Oct. 20 symposium, Laura Kennedy, DVM, Dipl. ACVP, assistant professor at the UK Veterinary Diagnostic Laboratory and the individual who performs necropsies, provided research that supports that contention.

"It happens," Kennedy said of

healthy horses taking bad steps on the track and suffering catastrophic injuries. "But in the vast majority of cases it's just not true. Does it exist at all? Probably, but it's usually a culmination of all the damage (sustained) up to that point."

The KHRC necropsy program began in January 2010. From that point through mid-2012, post-mortems were performed on horses that died from racing injuries; from mid-2012 to the present, fatal training injuries were examined.

Kennedy said that of 155 racehorse deaths, 136 were musculoskeletal and 19 non-musculoskeletal. There were 38 condylar fractures and 38 sesamoid fractures; of the condylar fractures half also involved sesamoids.

In a presentation that included numerous photos of parts of limbs removed from horses during necropsies, Kennedy showed that most cases involved pre-existing conditions as evidenced by fibrosis and new bone development. The KHRC necropsy program employs MRI technology that must be performed within 36 hours of death.

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Kennedy said an important aspect of the necropsy program is a mortality review, which involves a group of people, including the horse's trainer.

In one case, a Thoroughbred was 4½ years old before it was broken to ride. The horse made its first start as a 5-year-old and won, but returned a month later and suffered a catastrophic injury, she said.

The necropsy revealed the horse had dorsal metacarpal disease, commonly referred to as bucked shins.

"His bones were just not able to adapt (due to his late start)," Kennedy said. "The trainer was very appreciative of the (mortality review). As sad as this was, it will not happen to another horse

“Bad Step” Myth

in her care. That’s why I say we’re not too late.”

In another case, Kennedy noted a horse that suffered a humeral fracture, which probably had underlying pathology. She said such cases often come off layoffs of about 90 days for horses believed to have “vague lameness” and return to training quickly.

The horse in question was laid off for about 90 days, returned for a workout,

and sustained a humeral fracture that led to a catastrophic injury. The necropsy revealed fibrosis, new bone development, and lesions.

Kennedy said there is more to be done. She hopes the necropsy program expands to entail further evaluation of pre-existing conditions, more advanced imaging, biochemical examinations, and a closer look at soft tissue injuries. “Where is the bridge between soft tissue and musculoskeletal injuries?” she said.

In an earlier presentation, David Horohov, PhD, interim director of the UK

Gluck Equine Research Center and interim chair of the Department of Veterinary Science, discussed inflammatory gene expression in racehorses. He said inflammation is an initial response to injury and can be a result of mechanical damage, lactic acid accumulation, free radical accumulation, and damage-associated molecular patterns. Horses at risk to injury will display an increase in inflammatory gene expression, he said. **UK**

>Tom LaMarra is the award-winning news editor at *The Blood-Horse*.

Equipment for Managing Horse Pastures

Managing horse pastures can be a daunting task for any horse owner but especially for those with limited farm and equipment experience. There are many different tools you can use to improve horse pastures; selecting the right ones and using them at the right time is the key to success. In this article we’ll explore different pasture management equipment and how and when to use them.

Pasture Maintenance

Mower A mower is the most common implement used on horse farms. Mowing is generally required in the spring and through the fall to remove excess forage and/or reduce weeds, (although herbicides are generally more effective and economical to control weeds than mowing alone). Pasture mowers range from small riding mowers to 20-foot-wide batwing mowers. Consider your farm and tractor’s size when purchasing.

Chain Harrow A chain harrow is a simple, low-cost tool used to distribute nutrients (i.e., manure) more evenly throughout a field, usually in the spring and the fall. Chain harrowing, or chain dragging, will bust up manure piles left by horses and spread the nutrients within the pile over a wider area. Parasitologists recommend doing this in the heat of the summer months so the sunlight and heat will kill parasites. However, weed specialists



Small mower (top) and batwing mower (below)



Chain harrow

recommend against summer harrowing due to the potential of spreading warm-season weed seeds (i.e., crabgrass, nimblewill, ragweed, and thistle) around the field. Consider your field’s parasite load and weed pressure before deciding when to chain harrow.

Sprayer Use sprayers to apply liquid herbicides and sometimes liquid fertilizers. They come in many sizes: large boom sprayers for large fields; small tank sprayers mounted on all-terrain vehicles (ATV) for small farms/paddocks; or backpack sprayers for spot treatments. Read and follow all directions before applying herbicides, including washing out and dumping the sprayer afterwards. Clean the sprayer after use to ensure it will function the next time you need it. Do not leave unused spray in the sprayer for extended periods of time.



Sprayer



ATV with sprayer

Planting Preparation and Seeding

Disc Use a disc to break up sod and till soil before a complete pasture re-establishment. This will reduce surface compaction and unevenness, but will not bury weed seeds like a plow would. Take care when discing sloped fields, as cover will be greatly reduced, increasing the chances for erosion. You can also use a disc without plowing for “light tillage” to simply loosen the soil surface in preparation for seeding. Frequent discing of pastures can result in a “plow layer” of compacted soil 4-6 inches below the surface, but this is generally not a concern in pastures disced infrequently (every four to five years).

Plow Modern plows are not the one-horse plows of the past, but they accomplish the same thing. Use them to turn the soil over in preparation for



Disc

Pasture Equipment

complete pasture re-establishment. This is helpful when soils are heavily compacted due to years of machinery traffic. It is unlikely fields in pasture production for many years will need to be plowed;



Plow

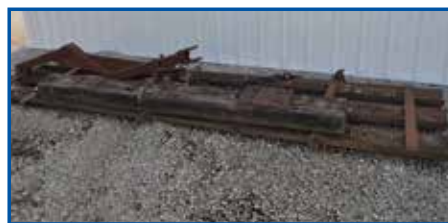
however, plowing can be useful for fields that were previously used for other crop systems such as corn or tobacco. Plowing is also an effective way to bury seed from undesirable plants such as weeds and endophyte-infected tall fescue and provide a fresh soil surface for reseeding a pasture. Plows come in a variety of styles and sizes with each performing a slightly different function. Consider the field's soil type and slope before plowing, as all cover will be removed and the potential for erosion loss will increase significantly.

Cultipacker A cultipacker has a set of heavy rollers and is used after plowing or discing to smooth the soil surface in preparation for seeding or to firm the seedbed prior to or after seeding. Some seeders are made with a seedbox and cultipacker combined into one unit. These are very effective for reseeding pastures after tillage (see Brillion seeders on next page).

Drag Also known as a drag harrow, this is an old cultivation implement. Drags are usually heavy and used to smooth the soil surface after plowing or discing. Large farms will likely have little use for a traditional drag but small farms might find them to be low-cost alternatives to other implements.



Cultipacker



Drag

Drill seeder For pastures that are being completely re-established and seeded into a prepared seed bed (using a combination of plow, disc, cultipacker, and/or drag), it is best to use a drill seeder to put seed in the ground. A drill seeder will have some type of disc that rolls across the ground, making a small slit at



Drill seeder

the appropriate depth in the dirt. Seed will then fall from the seed box (hopper) into this slit. Because seeds will not germinate unless they have good contact with the soil, you might need to cultipack after drill seeding to close up this slit, unless the drill has packing wheels. Seeding depth is absolutely crucial, so check the drill seeder to ensure correct seed placement.

No-till drill A no-till drill is a valuable piece of equipment for most horse farms. This implement drills seed into ground that has not been previously worked up using a plow or disc. This allows overseeding (seeding into an existing pasture to increase thickness) or re-establishment (seeding into a



No-till drill

MASTHEAD

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The Horse: Your Guide to Equine Health Care

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Pasture Equipment

pasture killed with herbicides) without the risk of significant erosion because it does not disturb or expose the soil. This is also beneficial in dry climates where plowing or discing would greatly reduce soil moisture. As with a drill seeder, it is very important to carefully adjust seeding depth.

Broadcast spreader These are simple funnel-shaped drums that mount on the back of a tractor or ATV and broadcast seed or fertilizer onto the ground. They are best used to spread granular fertilizers over pastures or seed clovers into a pasture in late winter (known as frost seeding). When seeding cool-season grasses using a broadcast spreader, it is essential to follow with a cultipacker to ensure good soil to seed contact. When using a broadcast spreader for fertilizer applications, be sure to clean the equipment thoroughly and lubricate after each use as many fertilizers will cause corrosion.



ATV with broadcast spreader

Brillion seeder Brillion Farm Equipment makes a broadcast seeder/cultipacker combo implement; combining both tools into one machine reduces your number of trips over a field. This will reduce soil compaction, labor, and fuel costs, but you have to use the seeder in tilled seedbeds.

Notes on Seeding

You can choose from many methods to seed your pastures, and each requires different implements. Seeding into a plowed, disced, and cultipacked area (known as a prepared seedbed) will result in the greatest chances for successful establishment. However, this method is also more expensive due to added time and equipment needs and has the greatest chance of erosion and weed pressure.

You can completely re-establish a field by killing existing vegetation using herbicides (applied with a sprayer) and drilling seed using a no-till drill. This method has great success rates when done properly, is low cost, and has less risk of erosion issues. Finally, you can overseed pastures by leaving existing vegetation standing and adding new seed using a no-till drill. Overseeding is low-risk and low-cost, but is usually only beneficial in thin pastures. When overseeding, mow or graze close to the ground, as seeds will only germinate where light can reach the soil surface. Frost seeding is only recommended for clovers (using a broadcast seeder) in late winter. This allows the freeze/thaw cycle to slowly work seeds into the ground. For all seeding methods, seed placement is crucial and is often the difference between a successful establishment and a failed one. Cool-season grasses should be placed ¼-inch deep in the soil. Most seeders have charts and adjustable dials or gears for setting seeding depth, but always check the actual placement of seed because factory settings are not always accurate.

Renting or Contracting Equipment

Smaller farms might not find it economical to own pasture equipment that will not be used frequently. Contact your local county extension agent or Natural Resource Conservation Service agent to see if you can rent equipment from those agencies. They might also direct you to local farm supply stores that offer rentals or will contract work such as seeding.

Other Equipment

Manure spreader A manure spreader can also be a useful pasture management tool. Load stall muck into the spreader in the barn and then spread on the field. Pastures benefit from the nutrients found in manure; however, the bedding material (usually wood shavings or straw) can harm pastures over time. Soil should have approximately two parts of carbon for every part of nitrogen (2:1 carbon/nitrogen ratio). Bedding materials often contain far more carbon and, if applied repeatedly over time, will result in a high carbon/nitrogen ratio in the soil. Compost stall muck first to greatly reduce the bedding's carbon, and then spread it onto the field using the manure spreader.

Core aerator Core aerators are commonly used on lawns and sports fields to



Brillion seeder

reduce compaction by removing small plugs of soil and creating air pockets. Air pockets allow water to run into the soil faster; therefore reducing runoff and increasing soil moisture. Aerators also increase oxygen in the soil, promoting increased root growth. Core aerators are not commonly used in pasture situations and their true impact is not fully known. In most situations, core aerators are probably not worth the financial investment for pastures.

Spike aerator Spike aerators are a variation of core aerators that have heavy steel spikes that penetrate the soil to create similar air pockets. In theory, they aerate the soil similar to a core aerator but will increase compaction in wet soils or not penetrate deep enough in dry soils. Soil moisture status must be ideal for a spike aerator to be effective.

Electric fence In some areas of the country an electric fence is a pasture management tool, while in others its use around horses is taboo. The truth is that owners can use electric fence can safely with horses to greatly increase pasture utilization. First install a solid perimeter fence such as plank fencing or mesh wire. Then use electric fence to subdivide large pastures and implement rotational grazing or to keep horses out of part of a pasture during herbicide applications or re-establishment. Safe and effective electric fence use includes proper installation and maintenance as well as proper introduction to horses that have not been around it before. For more information, view "Temporary Fencing for Horse Pastures" at ca.uky.edu/agc/pubs/id/id165/id165.pdf.

High-traffic area pads Also known as feeding pads, these pasture areas have been renovated to remove forages and are covered in a hard surface. You can use concrete or rock, but a combination of geotextile fabric and crushed limestone are best (and often less expensive). These pads create safe, solid footing in all weather conditions and reduce

Pasture Equipment



High-traffic area pads

erosion and hay losses. These pads are ideal for gate and watering areas, hay feeding areas, or high-traffic fencelines. For more information, check out “High-Traffic Area Pads for Horses” at uky.edu/ag/forage/foragepublications.htm.

Hay feeders Hay feeders are used to reduce waste and increase efficiency of feeding hay to horses in a pasture. Move hay feeders around the field to reduce hay feeding’s negative impact on spring pastures. Hay feeders come in many sizes and shapes that can accommodate small or large square bales or round bales and any herd size. Using hay feeders in combination with high-traffic pads can greatly minimize hay losses and pasture impacts. Several companies now make covered hay feeders that are ideal for preserving hay quality during rainy weather.



Hay feeder

Tractor or ATV Most of the tools listed in this article will require some type of machinery to operate. Large farms that need large implements will obviously need large tractors. However, small farms often do not have tractors. Many of the tools discussed in this article have been down-sized to fit on an ATV, greatly reducing the investment in equipment. Fortunately, most horse farms around the country are located near farm service dealers that rent equipment or will contract pasture management work such as spraying and seeding.



Tractor

Ultimately, improved pasture management will increase the quality and quantity of forage available to your horses while reducing the need for stored feeds.

Contact your local county extension agent for more detailed recommendations. **UK**

>Krista Lea, MS, assistant coordinator of UK’s Horse Pasture Evaluation Program; Ray Smith, PhD, professor and forage extension specialist; and Tom Keene, hay marketing specialist, all within the University of Kentucky Department of Plant and Soil Sciences, provided these information and photos.

WEED OF THE MONTH

Common name: Wild Violet (also blue violet, meadow violet)

Scientific name: *Viola papilionacea* Pursh

Life Cycle: Perennial

Origin: United States

Poisonous: No

Wild violet is distributed widely throughout the eastern United States and occurs most frequently in highly maintained pastures, turf grass, and landscapes. This low-growing plant forms dense colonies and thrives in pastures frequently mowed. Leaves are heart-shaped, and flowers have five blue- to purple-colored petals in a typical violet shape. It reproduces from flowers and stout rhizomes. Generally, flowers are produced from April through June, but this can vary. The plant is not susceptible to frost and grows readily in the fall and winter, depending on the severity of the winter. There are several other violet species that could be confused with wild violet.



This plant is very difficult to control. Mowing is ineffective and only a few herbicides will provide even partial control. Multiple herbicide treatments are needed for effective control. Consult your local Cooperative Extension Service personnel for information about herbicidal control in your area. **UK**

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

Survey Finds Farm Managers Practice Outdated Parasite Control Strategies

A recent survey conducted by researchers at the University of Kentucky found a high percentage of Thoroughbred farm managers used rotational deworming without monitoring drug effectiveness.

Martin Nielsen, DVM, PhD, Dipl. EVPC, ACVM, assistant professor at the UK Gluck Equine Research Center; and Jill Stowe, PhD, director of UK Ag Equine Programs and associate professor in agricultural economics, teamed up for the study.

They sent a survey to registered Thoroughbred farm managers in Kentucky to investigate their current approaches for parasite control, awareness of drug-resistant parasites, and possible willingness to change their current approaches. The study’s goal was to understand how experienced farm managers approached parasite control.

The survey showed nearly 70% practiced rotational deworming without monitoring drug efficacy, even though 80% of those surveyed indicated they take veterinarian advice into consideration for constructing their deworming strategies. The survey also found respondents dewormed horses five to

Parasite Control Strategies

seven times per year, depending on the horses' ages.

"Chances of finding an equine operation without drug-resistant parasites have become very slim in recent years," Nielsen said. "But the study suggests that although managers may be motivated to develop more sustainable deworming strategies, very few have actually done so."

Farm managers rarely monitor parasite egg shedding and evaluate treatment efficacy, and treatment intensities are substantially higher than recommended. The study results indicate a need for better dissemination of parasite control recommendations to farm managers and veterinarians.

"As scientists and experts we clearly

"The study suggests that although managers may be motivated to develop more sustainable deworming strategies, very few have actually done so."

Dr. Martin Nielsen

have not communicated our recommendations effectively to the end users," Nielsen said.

Respondents appeared willing to invest time and/or money in revised or new parasite control programs only if they could be assured success of avoiding resistance and parasitic diseases.

Farms closer to the Lexington area were also more likely to consider paying a premium for surveillance-based parasite control strategies. Respondents who have started using fecal egg counts in their deworming strategies were also more likely to pay a premium.

"This study shows that in addition to effectiveness of treatment strategies, farm managers also factor efficiency and time costs into their decision-making," Stowe said. "They are willing to adopt more expensive and time-intensive strategies only if those strategies are guaranteed to work exceptionally well."

Nielsen added it is important for farm managers to be aware they might be using drugs that no longer work due to drug resistance.

The paper titled "Attitudes towards implementation of surveillance-based parasite control on Kentucky Thoroughbred farms—current strategies, awareness, and willingness-to-pay" was published in *Equine Veterinary Journal*.

For more on parasite control guidelines, see the American Association for Equine Practitioners publication: aaep.org/custdocs/ParasiteControlGuidelinesFinal.pdf?osCsid=mn8molmtif6o0orrrksh0eac2. Nielsen chaired the task force for the publication. **UK**

>Jenny Evans, MFA, is the interim executive director of the UK Gluck Equine Research Foundation and marketing and promotion specialist senior at the UK Gluck Equine Research Center.

Early Arctic Blast Prompts Livestock Cold Stress Warning

An early blast of arctic cold has landed in the Bluegrass, putting pressure on farmers to make sure their animals are ready for the assault.

"Some locations may even see the livestock cold stress index dip into the emergency category," said Matt Dixon, agricultural meteorologist for the University of Kentucky College of Agriculture, Food and Environment. "This arctic air mass will continue to build ... and the lows the next few nights will bottom out in the upper teens and low 20s for most areas of the state. Wind chills could very well dip into the single digits at times."

These temperatures are about 20 degrees below normal for this time of year

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Early Cold Blast

and will create dangerous conditions for livestock and outdoor pets. To complicate matters, Dixon said some areas could even see periodic snow accumulations.

Livestock producers should make sure animals have adequate shelter, water, dry bedding, and feed to make it through this cold spell. Pet owners should bring dogs and cats indoors. UK livestock specialists said animals have higher energy requirements in the colder months, so producers should have high-quality grains and forages on hand to meet their needs.

The average horse, with a lower activity level, should eat between 1.5 and 2% of its body weight in feed per day to maintain its weight. UK equine specialist Bob Coleman, PhD, PAS, said feed requirements increase in the winter as horses use more calories to keep warm. He recommended providing extra hay and making sure horses have shelter to get out of windy, damp weather. It's also important for horses to have access to clean, unfrozen water. Make sure water sources are open for all livestock. A decrease in water intake will affect dry matter intake.

Similarly, cattle producers either need to increase their animals' feed intake or increase the diet's energy density by feeding higher quality hay or adding more grain or fat to the grain mix, said UK beef specialist Jeff Lehmkuhler, MS, PhD.

Lehmkuhler recommended that producers continue to monitor cows throughout winter and ensure they maintain good body condition.

"Poor-quality hay may not provide adequate energy to maintain gestating cows that are entering the third trimester," he said. "Consider having the hay tested to determine if you need to supplement during times of possible cold stress, especially for the enduring cold spells."

He suggested separating younger and thinner cows that might not have the same internal insulation as conditioned older cows and supplement them accordingly or offer them higher quality forage if available. Coleman said equine owners can employ similar strategies and separate horses according to body condition score.

"Producers should move cows to fields with natural windbreaks or provide man-made windbreaks, which are not the same as a barn," Lehmkuhler suggested. "Poorly managed barns combined with



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poor ventilation may actually hamper efforts to improve the environmental conditions. Lastly, remember it is energy or calories that are really needed. If the protein level in the forage is adequate, do not make supplement decisions based on protein level; rather purchase the most affordable calories. Stay warm, and keep the waterers flowing."

The lower critical temperature (LCT) value for cattle is the lowest temperature or wind chill at which no additional energy is required to maintain core body temperature.

"As the temperature declines below this lower critical value, the maintenance energy value for the animal is increased to maintain core body temperature," Lehmkuhler said. "Animals maintain core body temperature by increasing their metabolism, resulting in greater heat production, as well as other heat conservation strategies, such as reducing blood flow to the extremities, shivering, and increased intake."

Lehmkuhler said several things can influence lower critical temperature value: "Both external and internal insulation influences the LCT. External insulation

is basically the depth and thickness of the hair coat, condition of the hair coat, and thickness of the hide," he said. "Thin-hided breeds such as dairy breeds tend to have a lower insulating factor than thick-hided breeds like Herefords. The condition of the hair coat is extremely important as an external insulation barrier."

The hair coat is similar to home attic insulation that traps air, enhancing the insulating value. If the hair is wet and full of mud, air is excluded, reducing the insulating value and increasing heat loss from the skin to the environment. The hair coat's density and whether it is wet or dry impacts the wind chill temperatures at which cold stress is considered mild, moderate, or severe. As little as 0.1 inch of rain can immediately impact cold stress severity by matting the hair down and reducing its insulating ability. Acclimation time, hide thickness, fat cover, and other factors will also influence the degree of cold stress that animals experience. **UK**

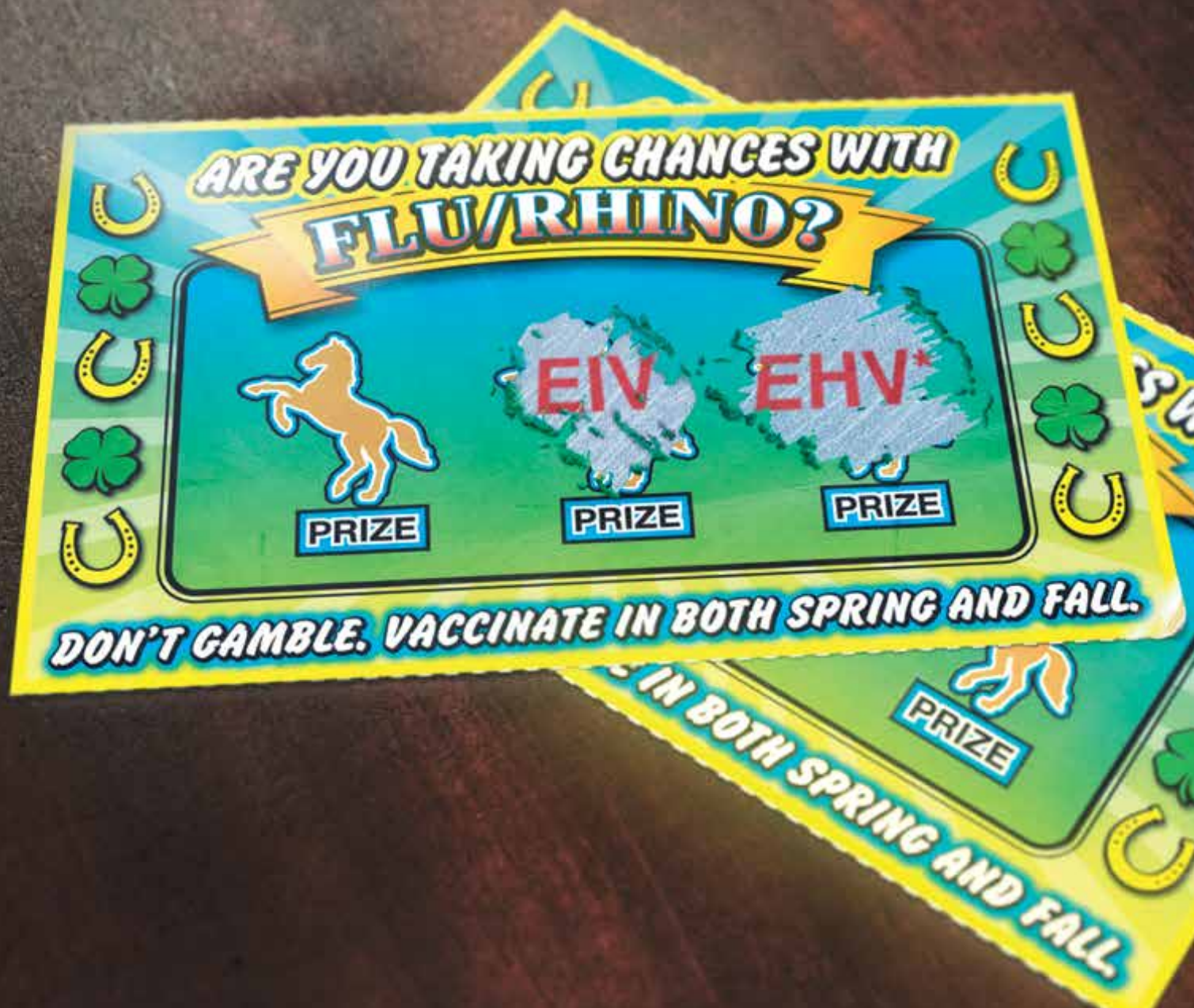
>Aimee Nielson is an agriculture communication specialist at the University of Kentucky.

Balasuriya Receives Bobby Pass Excellence in Grantsmanship Award

Udeni Balasuriya, BVSc, MS, PhD, a professor at the University of Kentucky Gluck Equine Research Center, received the Bobby Pass Excellence in Grantsmanship Award from Nancy Cox, PhD, dean of the College of Agriculture, Food and Environment, at the 2014 Celebration of Land-Grant Research on Nov. 18. Balasuriya received the award for leading a grant-funded project titled "Identification of Genetic Factors Responsible for Establishment of Equine Arteritis Virus Carrier State in Stallions," which received \$2.9 million over five years from the U.S. Department of Agriculture's National Institute of Food and Agriculture. The Bobby Pass Excellence in Grantsmanship Award is annually given in memory of former UK Department of Entomology chair Bobby Pass.



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*EHV-1 and EHV-4

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

² Manley L, Caceres P. Retrospective Cohort Study of an Equine Influenza Outbreak in the Chilean Army in the Metropolitan Region of Santiago, Chile, during 2006, in *Proceedings*. 12th Symposium of the International Society for Veterinary Epidemiology and Economics, Durban, South Africa 2009:64.

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The Equine Necropsy: A Sensitive but Important Topic

A necropsy is not something most horse owners contemplate until faced with the death of a horse. And upon losing an equine companion, most owners don't immediately think, "does my horse need a post-mortem exam?" Not all horses warrant a necropsy, but in this article we will help educate owners before they are faced with an urgent need for information about necropsies.

The necropsy procedure is also referred to as a post-mortem examination (PME), or autopsy, though the latter is generally reserved for humans. A necropsy involves multiple procedures; the first step is a "gross examination" (what can be seen without a microscope) of the inside and outside of the body. Prior to the gross exam, the examiner will read the case history, which should include details such as the length of illness, signs the animal displayed, any other animals affected, vaccination history, possible exposure to toxins, etc. Although the necropsy is a visual exam, it's also a multisensory experience: Do tissues feel normal by palpation? Is there an unusual smell? Based on case history and gross observations, the examiner might choose to save tissues for microscopic examination and select further tests to run. For example, he or she might elect to examine the spinal cord in a horse that could no longer stand, but not in a horse that had difficulty breathing. He or she might request bacterial cultures of the lung in a horse with clinical and/or gross evidence of pneumonia but not in a horse with suspected liver failure.

Microscopic examination (also referred to as histology) is conducted by a veterinarian who has undergone post-graduate residency training in pathology, similar to human medical pathologists. The examiner might find changes in organs that he or she did not observe grossly. If microscopic changes elucidate a process that went clinically or grossly undetected, the veterinarian might request other tests. For example, evidence of acute liver damage might warrant toxicologic testing for known liver toxins. The range of tests includes bacterial culture, virus isolation, fecal examination for parasites, serology (for detection of antibodies that indicate exposure to a disease-causing pathogen), molecular biology (for identification of pathogens that might be present in very



The examiner might choose to save certain tissues for microscopic examination.

low numbers), mineral analysis, and toxicologic analysis for specific toxins. The pathologist will consider all of these results to arrive at a diagnosis—a summary of the case—to report to the client.

The reasons most owners choose not to pursue a necropsy upon a horse's death include cost (particularly after a prolonged and expensive illness), the desire to retain the body for burial or cremation, and the lack of an available veterinary professional to perform the procedure. Necropsy costs range from \$130-500 or more, depending on the lab and in-state/out-of-state status. Discuss your options with your veterinarian before ruling out a necropsy.

A few reasons to perform a necropsy include:

- **To determine the cause of death or the event leading up to the necessity for euthanasia.** This is often for owner's peace of mind, but is also

commonly for insurance or legal documentation. It is difficult for all parties, including owners, managers, and veterinarians, to experience a death loss without an explanation. The primary goal of the necropsy is to answer: Why did this horse die?

- **Further characterization or confirmation of a disease process that was diagnosed clinically.** In some cases a second or predisposing condition is present that exacerbated the disease or made it difficult to treat. This information provided by the necropsy guides owners and veterinarians in future diagnostic and treatment decisions for their horses.

- **To determine whether a treatment had any effect, side effects, or unintended reactions.** Reporting adverse reactions to treatments is vital to ensuring other horses are not harmed by similar therapy and helping practitioners take steps to prevent adverse reactions to future treatments.

- **To answer questions about a condition the horse had that was unrelated to the cause of death,** such as mild recurrent colic, infertility, or lameness.

An extremely important reason, particularly in cases of sudden or multiple deaths, is to determine if other horses in the same herd or barn are at risk for contagious illness or death. A timely diagnosis can prevent future death losses. **UK**

>Lynne Cassone, DVM, Dipl. ACVP, a diagnostic pathologist at the University of Kentucky Veterinary Diagnostic Laboratory, provided this information.

Coffey Named Chair of UK Department of Animal and Food Sciences

The University of Kentucky College of Agriculture, Food and Environment has named Richard Coffey, MS, PhD, chair of the Department of Animal and Food Sciences.

Coffey is the current director of the UK Research and Education Center in Princeton, a longtime swine extension specialist, and leader of the college's youth livestock programs. He will begin his new administrative role by April 1.

"The department is on a forward-moving and successful trajectory and is positioned for a bright future," said Nancy Cox, MS, PhD, dean of the college. "It must sustain faculty excellence, enhance the already great undergraduate teaching program, support the diverse animal agriculture economy, and successfully transition to the university's values-based budget model. The overall consensus was Dr. Coffey is well-equipped to

Coffey Named Chair

lead the department to face these challenges.”

Because the department's work is critical to Kentucky's animal agricultural economy, animal agriculture community representatives, along with college administration, faculty, staff, and students, participated in the interview process and provided valuable input during the selection process.

“I'm excited to work with our department's outstanding faculty, staff, and students to maintain our excellence in research, teaching, and extension,” Coffey said.

Coffey received his bachelor's and master's degrees from Oklahoma State University and his doctorate from UK. After completing his doctorate in 1994, he became the UK swine extension

specialist in Lexington and eventually moved to Princeton. He will return to Lexington as chair.

Coffey replaces Bob Harmon, MS, PhD, who has chaired the department since 2000. Harmon will remain in the department as a professor.

“I would like to thank Bob Harmon for his valued leadership,” Cox said. “He was trusted by the administration for his ability to transmit department concerns in a strong and effective way. He is appreciated throughout the state and beyond for his contributions to Kentucky's animal agriculture. He is leaving the department in great shape.”

The college will soon be looking for new leadership for the center and for swine extension programming. **UK**

>Katie Pratt is an agricultural communication specialist for the University of Kentucky's College of Agriculture, Food and Environment.

Study: Hops Can Help Reduce Fructan Fermentation

Imagine miles and miles of beautiful, green, lush rolling pasture stretching to the horizon and surrounded by pristine white fences and glossy-coated horses grazing. It's hardly believable that the verdant grass these horses graze could lead to the debilitating hoof disease laminitis.

However, scientists have tied pasture-associated laminitis, or PAL, to horses' intake of nonstructural carbohydrates (sugars and starch), particularly fructans (long chains of fructose), in grasses. University of Kentucky (UK) researchers recently took some early steps toward finding a solution to this problem in a relatively common plant: hops (*Humulus lupulus*).

When fructans reach the horse's hindgut they cause certain strains of bacteria that produce lactic acid to proliferate, resulting in a drop in pH and a more acidic environment. Often referred to as hindgut acidosis, the pH decrease causes the intestinal cells to become more permeable, allowing bacterial metabolites to enter the bloodstream and ultimately leading to laminitis.

Similarities exist between equine hindgut acidosis and rumen acidosis in cattle. When a large amount of nonstructural carbohydrates reach the rumen, the main fermentation portion of the digestive tract, a bacterial strain known as *Streptococcus bovis* produces lactic acid and decreases the rumen's pH. Researchers have also discovered that while the ionophore monensin is toxic to horses, it is highly effective in treating rumen acidosis in cattle. Ionophores draw cations, such as potassium, out of cells, ultimately preventing further bacterial growth. With this in mind, a team from UK and the USDA Agricultural Research Service set out to evaluate whether a natural, nontoxic alternative to monensin—hops extract—could mitigate changes (such as lactic acid bacteria proliferation and a drop in pH) associated with fructan fermentation and laminitis development.

In their *in vitro* (in a lab environment) study the researchers collected fecal samples



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Study: Hops

from three Thoroughbred mares, aged 19 to 23 years, and isolated from them the bacterial cells. "This is the GI microbiologist's version of tissue culture," explained Michael Flythe, PhD, research microbiologist for the USDA Agricultural Research Service.

The researchers used inulin from chicory as a model fructan, as previous research has shown that administering this carbohydrate to horses will also cause laminitis. First, the team added inulin to each horse's bacterial cell suspension to determine its effect on pH. Next, they added hops extract to determine how it would affect lactic acid production.

As anticipated, adding inulin decreased the cell suspension's pH. When inulin was added with hops extract, the pH immediately decreased and then stabilized over a 12-hour period. However, hops extract additions at concentrations greater than or equal to 9 and 18 parts per million (ppm) mitigated pH decline.

The researchers then sampled, diluted, and incubated inulin-fermenting bacteria on growth media for 24 to 48 hours. After they isolated the bacteria, they performed genetic testing that classified the bacteria as *S. bovis*, which has previously been linked to laminitis development. The team also determined that by adding 18 to 45 ppm extract to the fecal cell suspensions containing inulin, they could inhibit *S. bovis*' lactic acid production by 90% and 99%, respectively.

So what does all this mean?

"This was a laboratory study that was performed to determine if hops extract could be used to control bacterial proliferation associated with fructan fermentation," explained Brittany Harlow, MS, a graduate research assistant at the University of Kentucky. "We found that in our *in vitro* model, hops extract at very low concentrations was extremely effective at mitigating the growth of these microorganisms (specifically *S. bovis*), lactic acid production, and consequent pH decline."

She said these results are exciting because they suggest that veterinarians could potentially use hops extract to control the microorganism-mediated problems linked to health conditions associated with carbohydrate overload.

Harlow cautioned, however, that this study was only conducted in the

laboratory with equine fecal bacteria, and the safety and efficacy of the hops extract in horses has not been tested.

"For that reason, we don't recommend that hops extract be given to horses yet," she said. "Hopefully, we will have the opportunity to test the safety and efficacy of hops extract using horses in the future."

The study, "Inhibition of fructan-fermenting equine faecal bacteria and *Streptococcus bovis* by hops (*Humulus lupulus* L.) β -acid," was published in the *Journal of Applied Microbiology*. **UK**

>Kristen Janicki, MS, PAS, is a performance horse nutritionist with Buckeye Nutrition.

2015 UK Equine Showcase and Kentucky Breeders' Short Course



Join the University of Kentucky's Ag Equine Programs for two events on two days with more than 15 top equine researchers.

January 23 4th Annual UK Equine Showcase
A program highlighting the university's current equine research programs and findings relevant to the industry.

January 24 6th Annual Kentucky Breeders' Short Course
An in-depth program on equine reproduction and horse management issues.



DoubleTree by Hilton
2601 Richmond Rd., Lexington

For more information, contact equine@uky.edu.
www.ca.uky.edu/equine



University of Kentucky Ag Equine Programs will host the UK Equine Showcase and the 6th Annual Kentucky Breeders' Short Course Jan. 23-24, both at the DoubleTree Suites by Hilton at 2601 Richmond Road, in Lexington.

The UK Equine Showcase, now in its fourth year, will highlight the university's current equine programs and relevant industry findings. It will run from 1 to 5:30 p.m. Jan. 23, with a light reception following. The 6th Annual Kentucky Breeders' Short Course is an in-depth program on equine reproduction and horse management issues from 8

a.m. to 5 p.m. Jan. 24, with lunch provided.

Both programs are open to veterinarians, owners, and managers of all horse breeds or anyone with an interest in learning more about equine reproduction and horse management topics. Continuing education credit for veterinarians and veterinary technicians is pending approval by the Kentucky Board of Veterinary Examiners.

UK is also accepting sponsor participation in the event. Display opportunities are available to participating organizations. Please email equine@uky.edu for details.

To register for the event, visit
<https://2015ukshowcaseshortcourse.eventbrite.com>

Lloyd's of London and UK College of Agriculture, Food and Environment Partnership Continues

The well-established and successful partnership between Lloyd's of London and the University of Kentucky College of Agriculture, Food and Environment continued when Lloyd's recently presented a check to UK.

"We are very pleased to announce an increase in Lloyd's annual support from \$45,000 to \$50,000," said Julian Lloyd, chair of Lloyd's Livestock Committee and bloodstock underwriter at the Am-lin Syndicate. "For 22 years the Lloyd's *Equine Disease Quarterly* has served as the benchmark publication for support of equine health. Lloyd's long-standing financial commitment to the University of Kentucky exceeded \$1 million a few

years ago, and this increase will help to ensure continued global distribution of this leading-edge publication."

The UK Department of Veterinary Science produces Lloyd's *Equine Disease Quarterly*, a research-based publication dedicated to equine health.

"The College of Agriculture, Food and Environment is grateful to Lloyd's of London for this long-standing and unique support of the veterinary science department in general since 1985, and of the *Equine Disease Quarterly* since 1992," said Nancy Cox, PhD, UKAg dean and director. "This year's support brings their total investment to more than \$1.1 million. We appreciate Lloyd's



COURTESY STEVE PATTON

Lloyd's of London representatives (left to right) Ken Maier, William Wallace, and Pat Talley presented a check for \$50,000 to fund the *Equine Disease Quarterly* to UK's Dr. Roberta Dwyer, Dr. Peter Timoney, and Dr. Alan Loynachan.

long-standing confidence in the impact of our *Equine Disease Quarterly*."

The award-winning publication includes articles written by prominent researchers from around the world and provides timely and authoritative reports on some of the most important issues facing the equine industry. It reaches more than 18,000 readers in 102 countries. Available in paper and online, its articles are regularly reprinted in scientific and lay equine publications worldwide.

Lloyd's *Equine Disease Quarterly* is available to subscribers at no charge. It is co-edited by Drs. Roberta Dwyer, Peter Timoney, and Alan Loynachan, all from the Department of Veterinary Science. The most recent issue is online at www2.ca.uky.edu/gluck/q_oct14.asp.

Lloyd's of London is a 325-year-old insurance market whose members underwrite risk on a direct and reinsurance basis in more than 200 countries. Lloyd's remains committed to supporting equine research and providing the insurance coverage essential to the well-being and prosperity of bloodstock interests worldwide. **UK**

>Aimee Nielson is an agriculture communication specialist at the University of Kentucky.

Horse Farm Disaster Preparedness

Roberta Dwyer, DVM, MS, Dipl. ACVPM, professor in the University of Kentucky Department of Veterinary Science, recently spoke at a UK Equine Forum meeting and discussed horse farm disaster preparedness.

The primary point in Dwyer's presentation was that human health and safety come first. Although she focused on natural and accidental disasters, she emphasized that it is important to have a plan for every type of disaster.

Plans should account for the unusual and unexpected, including loss of communications, loss of electricity, lack of personnel, and transportation limitations due to blocked roads. First start with a personal disaster plan, then create family, farm, communications, and evacuations plans. Situations to plan for include having no electricity, no movement on or off the farm, and no communication for seven or more days. "The loss of electricity can also mean no water supply for farms dependent upon well water, as well as frozen pipes in winter," said Dwyer. Also consider what would happen if there was a 24-hour notice of evacuation or downed fencing and loose animals.

Dwyer said owners often debate whether they should leave horses in or out during different types of storms (high winds, tornadoes, flooding, etc.). While there is no straight answer, owners should consider the barn structure, age, location, and available pastures and make educated decisions before weather strikes. "Every home and barn should have a NOAA weather radio for advanced warning of dangerous weather conditions" Dwyer recommended.

Dwyer explained the types of disasters, how they are declared, and what resources are available at each level. The county Emergency Operations Center (EOC) coordinates locally declared disasters, and the state EOC coordinates governor-declared disasters with state resources made available. The governor can also request federal disaster declaration from the president, which makes federal resources available. There are numerous emergency support functions ranging from firefighting to long-term community recovery.

Dwyer is also a lead instructor for the nationally funded and recognized Extension Disaster Education Network "Strengthening Community Agrosecurity Preparedness" program, a two-day workshop. **UK**

>Hannah Forte is a communication intern with the UK Ag Equine Programs and Gluck Equine Research Center and undergraduate student majoring in community and leadership development at UK.

UPCOMING EVENTS

December 3-6

Kentucky Farm Bureau Federation 95th Annual Meeting, the Galt House Hotel, Louisville.

January 23-24

4th Annual UK Equine Showcase and 6th Annual Kentucky Breeders' Short Course, DoubleTree Suites by Hilton, Lexington. To register, visit <https://2015ukshowcaseshortcourse.eventbrite.com>.