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New Knowledge Comes Through New Research

Eastern tent caterpillars are numerous on our small Central Kentucky farm this year. They have defoliated the spring leaf growth on most of the wild black cherry trees and are now crawling around in great numbers on board fences, stone walls, and most points in between.

This makes a recent scientific publication all the more timely. In an invited review for the April issue of the *Journal of Animal Science* (<http://jas.fass.org/cgi/reprint/88/4/1379>), the Gluck Equine Research Center's Karen McDowell, PhD, and co-authors from several University of Kentucky departments provided an overview of their scientific research. They indicate small hairs (setae) projecting from the cuticle of these caterpillars have a central role in the cause and progression of Mare Reproductive Loss Syndrome (MRLS). Combined with published studies from a number of independent groups, these data strongly suggest that the oral intake by horses of Eastern tent caterpillar cuticle and setae—and apparently another species of hirsute (hairy) caterpillars in Australia—causes MRLS in pregnant mares and less frequently other serious health problems, including pericarditis and endophthalmitis.

Since I study the musculoskeletal system, any further discussion of insects and reproduction is risky. However, I do believe this example clearly illustrates the essential role of scientific research in advancing our knowledge of horse health and indeed all things related to equine science.

Prior to the spring of 2001, MRLS had not been recognized as a clinical entity. Our current understanding of the epidemiology, pathology, bacteriology, immunology, toxicology, and clinical aspects of this disease has come through scientific research conducted over the last nine years. Are there additional questions and debate related to MRLS? Of course. This is to be expected and will always be the case for an interesting topic. There will always be more questions and alternative ideas.

Additional knowledge, however, can only come from new data generated through further research. We can question, we can speculate, we can debate, and sometimes we can even argue. In the end, though, a better understanding of MRLS or any other equine science topic (biomedical, management, economic, etc.) does not come from personal opinion, but from high quality and rigorous scientific research. In the absence

ARTICLES OF INTEREST

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of experimental data from well-designed studies, we have no mechanism to truly advance our knowledge and understanding. **UK**

James N. MacLeod, VMD, PhD, director of the UK Equine Initiative and Dickson Professor of Equine Science and Management and the John S. and Elizabeth A. Knight Chair at the Gluck Equine Research Center, submitted this commentary.

TO WORM OR NOT TO WORM, THAT IS THE QUESTION

After a snowy winter, temperatures in Central Kentucky are seasonably warm once again. Grass is green, birds are singing, and equine parasites are stirring back to life. This is the time of year when horse owners and farm managers become aware of worms and make plans to combat them.

Many farms follow a calendar schedule dictating what type of deworming product to use and when, while others use a seasonal method and do not deworm at all during certain times of the year. According to the University of Kentucky's Mary Rossano, MS, PhD, assistant professor in animal and food sciences, many people who practice seasonal deworming assume parasites die during winter and there is no need to administer dewormer in the colder months.

Actually, Rossano said, the reverse is true south of the Ohio River, where summer is often hot and dry enough to kill most parasite larvae before emergence or on grass blades before ingestion. In colder climates some types of worm larvae can survive under several inches of snow, although

EASTERN TENT CATERPILLAR EGG HATCH UNDER WAY, NUMBERS UP AGAIN

Experts report Eastern tent caterpillars are hatching in Central Kentucky in increasing numbers. "Some tents are the size of baseballs now, so they will be easy to see," said Lee Townsend, PhD, a University of Kentucky College of Agriculture entomologist. "Caterpillars in tents out on limbs are now relocating and building large tents on branch angles on the main trunks."

According to Townsend, now is the time to check wild cherry and related trees for Eastern tent caterpillar activity to determine whether or not any management is necessary.

"Tent caterpillar populations have been gradually increasing over the past two to three years and seem to be up again this year," Townsend said. "Populations vary considerably from location to location in a county."

Entomologists anticipate full-grown larvae by the third week of April. From the end of April to the beginning of May, caterpillars will likely leave the trees where they've eaten the available foliage and search for additional food to complete their development.

Once the caterpillars have reached these dispersing stages, controlling them becomes much more difficult, Townsend said.

Controlling Eastern tent caterpillars is vital to area horse farms, as UK research has strongly linked the caterpillars with outbreaks of Mare Reproductive Loss Syndrome (MRLS), which can cause late-term foal losses, early-term fetal losses, and weak foals.

During the 2001-2002 MRLS outbreak an estimated 30 percent of the 2001-2002 Thoroughbred foal crop was lost, and the state suffered an economic cost of approximately \$336 million due to losses suffered in all breeds of horses.

UK researchers conducted epidemiological and field studies that demonstrated MRLS was associated with unprecedented populations of Eastern tent caterpillars on Kentucky horse farms. Studies since the 2001-2002 outbreak subsequently have revealed that horses inadvertently will eat the caterpillars, whose hairs embed into the lining of the alimentary tract. Once that protective barrier is breached, normal alimentary tract bacteria might gain access to and reproduce in sites with reduced immunity, such as the fetus and placenta. Fetal death from alimentary tract bacteria is the hallmark of MRLS.

UK entomologists recommend that unless horse farm managers have been aggressive in managing Eastern tent caterpillars or removing host trees, they should keep pregnant mares out of pastures bordered by cherry trees or other hosts for the next several weeks. **UK**

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

(To Worm...)

they are less likely to be ingested.

Deworming practices depend on the age of the horse under consideration. Since there are several types of parasites, each with different means of action, transmission, and temperature tolerance, it is important for horse farm managers to know which types are targeting their herd. Ascarids, commonly called "roundworms," hatch inside the horse and migrate through the liver and lungs to feed in the small intestine and primarily affect young horses until they are one to two years old. Small strongyles, on the other hand, are the major parasite of concern in adult horses and attack the large intestine. Most foals develop small strongyle infections in their year of life and gradually build immunity as they reach adulthood. Bots, pinworms, and tapeworms are rarer and seasonally affect adult horses. Each type of worm responds differently to the various types of dewormers and some (particularly small strongyles) are becoming highly resistant.

That is why, Rossano said, horse owners should reconsider the calendar method of deworming and consult their veterinarian to develop a strategic parasite control program based on evidence obtained by testing horses at the farm. The goal of this approach is to determine what parasites are present, which drugs are effective for that population of parasites, and to reduce unnecessary deworming.

"The more frequently we deworm, the faster we select for drug resistance in parasites," Rossano said. "When it comes to small strongyles,

WEED OF THE MONTH

Common name: Canada thistle

Scientific name: *Cirsium arvense (L.) Scop.*

Life Cycle: Perennial

Origin: Eurasia

Poisonous: No

Canada thistle is distributed across the northern United States and Canada. It's listed as noxious in many states and classified as a prohibited noxious weed seed in many state seed laws.

This invasive species can grow up to 4 feet tall and is frequently found in pastures, rangeland, and along roadsides. This perennial thistle reproduces from seeds, on underground crown buds of the parent plant, and on adventitious buds (arising or occurring sporadically or in areas other than the usual location) on creeping roots. Purple- to rose-colored flowers form at the end of stems and are about one inch in diameter. Flowering occurs from July through August. Unlike many other thistles, Canada thistle is dioecious, which means one plant has either female or male flowers but not both.

Canada thistle is native to Europe, western Asia, and northern Africa. It was first introduced into North America as an impurity in seeds imported into Canadian provinces, hence its name. The weed was first known to be in the United States in the early 1700s. Canada thistle grows rapidly and spreads readily in pastures. It decreases available forage, because it inhibits grazing due to sharp spines on leaves and stems.

Controlling Canada thistle in pastures is very difficult. Mowing and tillage are ineffective, and treatment with herbicides requires multiple applications. Consult your local Cooperative Extension Service personnel for a list of herbicidal controls in your area. [UK](#)

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



Canada Thistle

there might be times of the year when it's a good idea to hold back, and that's appropriate if there are horses whose deworming frequency is reduced to twice a year. This will reduce selection pressure on the parasites and hopefully slow the

development of drug resistance."

Rossano said there is a program designed to deworm only the most infested horses in a pasture group. Some horses seem to attract more worms than others and consequently become "high

(To Worm...)

shedders." Fecal egg counts should be done to assess which horses are high shedders. Those are the horses that receive the most benefit from deworming products, while low shedders do not necessarily need them. The herd should be re-tested periodically, but high and low shedders usually remain in their respective categories for life. Controlling contamination from high shedders during the seasons when parasite survival is most favorable helps reduce the opportunity for reinfection of the high shedders. Deworming a limited number of animals limits the parasites' chances to become drug resistant.

Rossano cautioned that research on the topic of scheduled deworming is limited since drug resistance has increased so quickly and has yet to produce consistent guidelines. She also pointed out that scientists are still learning about the seriousness of certain types of parasites, which could affect the need for treatment.

"As we try to get more evidence to back up the protocols we recommend, there needs to be a better understanding of the true disease outcomes related to parasites. Few controlled population studies exist to help us understand those questions," Rossano said.

For more information on equine parasites, contact your veterinarian, your local Cooperative Extension agent, or see *The Horse's* "Parasite Primer" (www.thehorse.com/4853). **UK**

Natalie Voss is a UK equine communications intern and undergraduate student in equine science and management.



Nina Bonnie, accomplished equestrienne, Kentucky Horse Park Foundation creator, and driving force behind the park, spoke at the University of Kentucky Equine Initiative Distinguished Industry Lecture Series April 1. Approximately 60 people attended the lecture at the Maxwell H. Gluck Equine Research Center. Dan Liebman, editor of *The Blood-Horse* magazine, interviewed Bonnie. The Distinguished Industry Lecture Series is designed to showcase distinguished industry practitioners from the broad equine industry and is targeted toward students and a variety of UK stakeholders. Keeneland president Nick Nicholson spoke at UK's inaugural lecture in Nov. 2009. The second lecture series was sponsored by Equine Medical Associates, PSC. For more information about the event, visit www.ca.uky.edu/equine.

Breakthrough in Genetic Testing of Embryos

Early this year, frozen embryos that had undergone genetic testing were thawed and successfully transferred into the uteri of surrogate mares at Minitube International Center for Biotechnology in Mount Horeb, Wis.

The benefit of genetic testing of embryos is the ability to detect genetic diseases and traits prior to establishing a pregnancy. There are numerous diseases for which genetics have been

identified, including muscle disorders in Quarter Horses, neurologic disorders in Arabians, and a lethal gene associated with particular coat color in Paints.

Mats Troedsson, DVM, PhD, Dipl. ACT, director of UK's Gluck Equine Research Center and chair of the Department of Veterinary Science, was the principal investigator for the research project. Troedsson is also a consultant for Minitube.

Researchers collected 6½-day-old embryos from eight mares and obtained biopsies from embryos. They cryopreserved (preserving tissue

(Embryos...)

under freezing conditions) the embryos immediately after obtaining the biopsies. They used PCR (polymerase chain reaction), a common laboratory tool to identify genetic material in a sample, to determine gender on the biopsied cells. Gender determination was used as a model for genetic testing in this study. The cryopreserved embryos were then thawed and transferred into the uterus of surrogate mares. Six out of the eight embryos developed as pregnancies.

Three out of the six embryos were lost after approximately one month, and three were maintained in the surrogate mares. One mare foaled a healthy and normal foal in Jan. 2009, and the other two mares are due to foal later this spring and summer.

“The method is a breakthrough, because it allows those who breed horses whose registries allow assisted reproduction to test embryos for lethal and debilitating disease genes, coat color, and other genetic traits without having to maintain a mare’s pregnancy for 11 months before the foal can be tested,” Troedsson said.

Troedsson said this method is used in human assisted reproduction programs, but this is the first time it has been used successfully in horses.

With the recent completion of the equine genome, Troedsson said it is expected that owners will want to have their horses tested for genetic-related diseases rather than taking the risk of giving birth to a foal with genetic diseases.

Minitube’s goal is to advance animal reproduction technologies through research and development,


TOXIN TOPIC ANTICOAGULANT RODENTICIDES

Many horse owners do not realize that baits used to kill mice, rats, and small rodents are also poisonous to horses and other mammals. Several types of rodenticide baits are available, but the most commonly used products are the anticoagulant rodenticides, which prevent clotting of blood. The more common ones include brodifacoum, diphacinone, and warfarin.

Anticoagulant rodenticides cause a depletion of blood clotting factors leading to uncontrolled bleeding and death. Bleeding can occur anywhere in the body and may not be evident externally. Clinical signs usually start two to five days after exposure and are dependent upon where bleeding occurs in the body. Signs can include depression, weakness, pale membranes, bleeding from gums or nostrils, blood in urine or feces, trouble breathing, lameness, abdominal distension, and external swellings.

Products come in a variety of formulations such as treated grains or grain-based products, blocks, pellets, granules, place-packs, powders, and bars. They also come in many different colors, including green, blue, red, and tan. Products are often flavored to tempt rodents, usually with grains or flavors such as peanut butter—which are also very attractive to horses and other animals. Products can be purchased at any farm and ranch supply, home-and-garden retailer, or grocery store.

The newer anticoagulant rodenticides, such as brodifacoum, are much more potent than older products such as warfarin, and ingestion of much smaller amounts can cause poisoning. The minimum toxic dosage for each of the rodenticides has not been determined in horses. Most clinical cases of anticoagulant rodenticide poisoning in horses occur when the animals gain access to storage areas that contain baits.

Treatment of horses exposed to anticoagulant rodenticides can be very successful, especially if the exposure was witnessed and treatment is initiated before clinical signs occur. Contact your veterinarian immediately if you suspect your animal has had access to a rodenticide bait. Keep all rodenticide products securely out of reach of horses and other domestic animals or children. Be aware that rodents can move baits to nests or other areas. Also be aware that dogs and cats are at much greater risk of poisoning from rodenticide products than are horses, due to their much smaller size. Lastly, consider using a good barn cat to provide rodent control rather than using poisonous rodenticide products. 

Cynthia Gaskill, DVM, PhD, clinical veterinary toxicologist at the University of Kentucky Livestock Disease Diagnostic Center, provided this information.

manufacturing and distribution of products and services for artificial insemination, embryo transfer, *in vitro* fertilization, and other assisted-reproduction technologies. Minitube has several

locations in the United States, Canada, Mexico, and Germany.

Alexandra Harper is a UK equine communications intern and undergraduate majoring in communications.

Kentucky Horse Park Stream Project to Improve Water Quality

The Bluegrass Partnership for a Green Community has been working to make the 2010 Alltech FEI World Equestrian Games as “green” as possible. One of the project’s focal points has been to protect and improve water quality in and around the Kentucky Horse Park. The streams that flow through the park are part of the Cane Run watershed, which contributes to the drinking water of Georgetown. The water in these streams can be protected by adding vegetation to stream banks.

With the assistance of landscape architects at M2D Design Group, the UK Cooperative Extension Service-KY Division of Conservation has developed a landscaping plan for the streams at the Kentucky Horse Park. Installation of streamside vegetation presents wonderful legacy opportunities at the Kentucky Horse Park. This project will establish trees, shrubs, and wildflowers that are Kentucky native, with plantings beginning in April and May 2010. The Cane Run watershed will see tremendous benefit from these features, such as reduced erosion on stream banks, pollution prevention from parking lot runoff, and enhanced stream habitat.

This Best Management Practice (BMP) in the Cane Run watershed will have high visibility, community participation, and a large educational audience. This BMP will be installed almost entirely by volunteers. Through the installation process, volunteers will learn more about watershed stewardship and riparian buffers as they help plant Kentucky native grasses and wildflowers. It will also demonstrate a practice relevant to equine operators as well as agricultural, business, municipal, and residential property owners. A recreation trail will be built along the planting, and interpretative signs and educational material will be posted along the route.

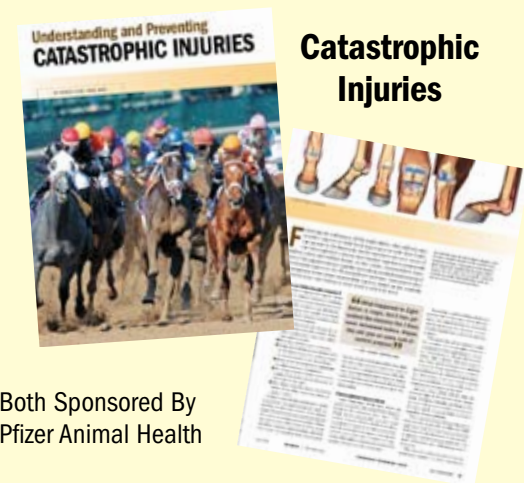
This work was funded in part by a grant from the U.S. Environmental Protection Agency under section 319(h) of the Clean Water Act through the Kentucky Division of Water to the University of Kentucky. 

Contributed by Amanda Abnee Gumbert, MS, Extension Water Quality Liaison, UK Cooperative Extension Service-KY Division of Conservation

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U.K. Women's Polo Team Wins Nationals

The University of Kentucky women's polo team topped three other teams at the United States Polo Association National Intercollegiate Championships April 5-10 in Charlottesville, Va., to capture its first national title. Additionally, one of UK's horses was named best polo pony in the men's division, and UK's polo string earned designation as overall best polo string in the men's division.



To the victor go the spoils. Left to right, Meghan Shader, Cary Campbell, coach Jorge Vasquez, Courtney Asdourian, and Posey Obrecht hoist the tournament trophy.

Only four years old, the upstart team was an unlikely victor. Having fallen short in its run to a spot at the national championship with a loss at the March regional competition, the UK women's team earned a second chance to compete at the national competition due to its performance during the regular season.

And then the team won. And won again—first at California Polytechnic State University where UK came out on top 20 to 6. Next, UK took on top-seeded Cornell and came out ahead 18 to 12. In the finals UK played against Texas A&M and won by one point, with a final score of 15-14.

"I am so unbelievably proud. I went to Charlottesville with two others who were competing on the team and we were in tears," said Tannis Marley, co-founder and past president of the team. "I just thought it would be a fun thing to do when I went to college, and now we're national champions. I'm just so proud of all the hard work and dedication and support this team has had over the years."

The team is coached by Jorge Vasquez, manager of the Lexington Polo Club. The championship team included riders Courtney Asdourian, a sophomore majoring in history and Spanish; Cary Campbell, team president and a junior majoring in family studies; Posey Obrecht, a freshman majoring in equine science and management; and Meghan Shader, a sophomore also majoring in equine science and management. Asdourian was also named to the All-Star Team.

"I'm so excited. To see where we were four years ago and now where we are," Marley said. "I had so many people coming up to me at the event wanting to come to UK just to play polo. We already have nine recruits coming next year. It's just amazing." **UK**

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

Gluck Equine Research Foundation Releases Inaugural Research Report

The University of Kentucky Gluck Equine Research Foundation, Inc. published an inaugural research report in April.

The 56-page *Research Report 2009* focuses on the research accomplishments and scientific publications published during the calendar year by the faculty at the University of Kentucky Maxwell H. Gluck Equine Research Center.

"The *Research Report* is a scorecard for what the Gluck Equine Research Center faculty accomplished last year," said Ed Squires, PhD, Dipl. ACT, executive director of the Gluck Foundation and director of advancement and industry relations. "This will serve as an important tool to showcase what research is currently being conducted at the Gluck Center to our stakeholders."

Each year, more than 20 faculty members at the Gluck Center are assisted by students, postdoctorals, and visiting scientists in conducting research in six areas: genetics and genomics, infectious diseases and immunology, musculoskeletal science, parasitology, pharmacology/toxicology, and reproductive health. The *Research Report* is divided by groups and includes each

faculty member's educational background, interests, projects, and graduate students. It also includes 2009 research technicians/assistants and visiting scientists.

"Our No. 1 goal at the Gluck Center is focused on improving the health and well-being of the horse," Squires said. "I think the information in the *Research Report* reflects our accomplishment toward the Gluck Center's mission."

Other information in the *Research Report* includes Gluck Equine Research Center grants and awards and scientific publications, including books/chapters in books, refereed journal articles, non-refereed journal articles, and seminars and papers presented. Individuals and organizations who

donated money to the Gluck Foundation in 2009 are also recognized in the *Research Report*.

The *Research Report* is available online at www.ca.uky.edu/gluck or at www.ca.uky.edu/equine. For more information contact Jenny Blandford at jenny.blandford@uky.edu or 859/257-4757, ext. 81089. 

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



U.K. HORSE PASTURE EVALUATION PROGRAM GOES STATEWIDE

During the past five years, the University of Kentucky's Horse Pasture Evaluation Program has analyzed just under 60 horse farms and 4,900 acres of horse pastures in Central Kentucky. Now, for the first time, the program will be available statewide. The program will also offer a small farm option. To read more about the program, please see the story featured in February's issue of the *Bluegrass Equine Digest* (www.thehorse.com/15894).

WARMER WEATHER CALLS FOR CLOSE MONITORING OF STORED GRAIN

With the early onset of warm temperatures this spring, stored grain operators need to closely monitor their inventories to stay ahead of any problems that might result in a loss of grain quality. Any sudden changes in temperature and moisture levels in the bin could be a sign of mold or insect activity, said agricultural engineers with the University of Kentucky College of Agriculture.

Growers dealt with exceptionally wet weather during the 2009 harvest, and much of the grain never dried enough for safe storage through the spring or summer.

(Stored Grain...)

“Cooler temperatures provided a margin of storage life last fall, but grain moisture must be controlled as the crop is held in warmer weather,” said Sam McNeill, UK extension agricultural engineer.

For example, corn in good condition will store well at 15 percent moisture up to 60°, but should be dried to 13 percent as average temperatures approach 80°. Corresponding moisture levels for soybeans are 13.5 and 11 percent at these same temperatures. Grain in poor condition should be even drier to avoid spoilage as temperatures warm.

Fortunately, good drying conditions this spring will help farmers finish drying wet grain either in the bin or by using a high-speed dryer with low heat.

“Corn and soybeans can be dried to safe storage levels in a bin within one to three weeks of continuous fan operation with good drying conditions,” said Mike Montross, associate professor in the UK Department of Biosystems and Agricultural Engineering.

The amount of time it takes the grain to dry down to safe storage levels will depend on the amount of airflow in the bin, outside temperatures, and humidity.

Storage life decreases as the temperatures rise. Also, the higher the moisture level in grain with mold damage and low test weights, the shorter the storage life. One percent of moisture can make a huge difference in the crop’s storage life, especially for poor quality grain. For example, mold-damaged soybeans stored at 14 percent moisture and corn stored at 16 percent moisture have a storage life of 7.5 months when cooled to

40°. However, poor quality soybeans with 15 percent moisture and corn with 17 percent moisture cooled to the same temperature only have a storage life of 4.7 months after harvest. This means some of the grain harvested last season might already have passed its safe storage life and could have lost 0.5 percent of dry matter and/or a loss in market grade.

While monitoring stored grain is important, grain storage operators and all of their employees should be cautious when inspecting stored grain with above-average damage levels. Historically, more entrapment and suffocation accidents have occurred in years when grain is generally in poor quality.

For more information on drying grain this spring, visit the UK biosystems and agricultural engineering extension Web site at www.bae.uky.edu/ext/. **UK**

Contact: Sam McNeill, 270/365-7541, ext. 213; Mike Montross, 859/257-3000, ext. 106

UPCOMING EVENTS

April 26-27, Kentucky International Equine Summit, Hilton Hotel in downtown Lexington. See www.kyequinesummit.com for more information.

April 29, 4 p.m., UK Department of Veterinary Science Equine Diagnostic Research Seminar Series at the Kentucky Horse Park. Cornell University’s Professor of Comparative Obstetrical and Gynecological Pathology, Donald Schlafer, DVM, MS, PhD, will speak about reproduction.

April 30, Kentucky Oaks, Churchill Downs, Louisville.

May 1, Kentucky Derby, Churchill Downs, Louisville.

May 15, “Green Friends of the Games,” a reception to benefit the 2010 Alltech FEI World Equestrian Games, Governor’s Mansion, Frankfort, \$500. Contact Carol Hanley at 859/333-8248 for more information.

May 27, 4 p.m., UK Department of Veterinary Science Equine Diagnostic Research Seminar Series at the Kentucky Horse Park. Colorado State University’s Kevin Haussler, DVM, DC, PhD, will speak on therapeutic options.