EQUINE DISEASE QUARTERLY

FUNDED BY UNDERWRITERS AT LLOYD'S, LONDON, BROKERS AND THEIR KENTUCKY AGENTS

OCTOBER 2009
Volume 18, Number 4

COMMENTARY

IN THIS ISSUE

UK
UNIVERSITY OF KENTUCKY
College of Agriculture
Department of Veterinary Science

LLOYD'S

ANIMAL GUARDIANSHIP: Imagine that overnight a new state law goes into effect declaring that from now on you do not own your animals but rather you are their "guardian." Does this sound farfetched? Some local communities have already made this change The first legal step on this road has been the addition of "owner-guardian" language to local ordinances, then changing the wording to "guardian" only. One state now has "owner-guardian" as a part of its law, and various federal agencies are using the word "guardian" in conjunction with "owner" whenever the latter appears in their regulations.

Animal guardianship advocates suggest that referring to the human-animal relationship as one of guardianship rather than ownership will lead to better animal care. There is little basis for this assertion; an abusive animal owner would likely be an abusive animal "guardian."

While local ordinances to date have generally applied only to dogs, cats, and other companion animals, a next step would be to expand such laws to include all domestic animals. With the groundwork in place, guardianship advocates could then move to the state level.

"Ownership" and "guardianship" are two distinct legal terms. The first is an expression and protection of the property owner's legal rights, while the second imposes numerous legal duties and obligations on the guardian. Today as an animal owner, you can decide the animals' care and future as long as you are not abusive, cruel, or neglectful: what to feed or where to house them; which animals to breed them with; what veterinary care to provide; whether to sell them, put them down, or include them in your Will.

If the law changes and you no longer own your horses but instead become their "guardian," you will always have to act in the horses' best interest. As you can well imagine, there will be many times when your horses' best interests are not yours: euthanizing a horse to avoid a substantial veterinary bill could be prohibited, as could using horses in endeavors like racing and showing. A guardian would be unable to sell horses, as they are no longer property.

If you no longer own your horses, property insurance policies might not cover the loss of your horses or injury to them. Expenses, write-offs, and other deductions under federal and state tax laws, which are predicated upon horses being property and assets belonging to their owners, might no longer be available.

A successor-guardian could be appointed to sue you on behalf of your horses for not having taken care of them properly, for their injuries, and even for their deaths. The list of legal repercussions that could befall horse owners should the law be changed from ownership to "guardianship" is extensive, and it behooves the horse industry to remain vigilant about pending legislation.

CONTACT: Gregory M. Dennis, JD, (913) 498-1700, gdennis@ktplaw.com, Kent T. Perry & Co., L.C., Overland Park, Kansas.

INTERNATIONAL

Second Quarter 2009

THE INTERNATIONAL COLLATING CENTRE, Newmarket, England, and other sources reported the following disease outbreaks.

Contagious equine metritis (CEM) was recorded in France, the USA, and the United Kingdom (UK). One case of *Taylorella equigenitalis* infection was confirmed in France. The number of CEM-carrier animals detected in the USA since the disease was initially confirmed mid-December 2008 remains at 20 stallions, one gelding, and five mares. With one exception, all carrier stallions have been non-Thoroughbreds located at facilities specializing in semen collection for artificial insemination. No evidence exists of spread of CEM to the Thoroughbred population. The isolation of *T. equigenitalis* from a non-Thoroughbred performance horse stallion was reported from the UK. The stallion was a European import and had not been bred after entry to the UK.

Isolated cases of abortion attributable to EHV-1 were confirmed on one premises in France, four premises in Ireland, and two premises in Japan. The UK reported 14 cases of abortion attributable to EHV-1. Single cases of EHV-1 neurologic disease were diagnosed on two premises in Ireland, and multiple cases of EHV-1 were reported on a third premises. Sporadic cases were reported on three premises in the UK. Equine herpesvirus-4 was responsible for three cases of abortion and two cases of respiratory disease in Ireland and one case of respiratory disease in the UK.

Mild outbreaks of equine influenza were confirmed on two premises in the UK. Spain reported five cases of influenza in Thoroughbreds, and Sweden recorded the disease on two premises. Influenza was diagnosed on eight premises in France involving multiple breeds; all were epidemiologically linked. The virus was closely related to the Ohio 2003 strain of H3N8 virus.

Twenty-one cases of strangles in 10 separate outbreaks were recorded in Ireland; Sweden reported the disease on 28 premises, and it was confirmed in at least 30 horses on three premises in South Africa. Isolated cases occurred on six premises in France.

The annual recurrence of African horse sickness in South African horses involved primarily mild disease in young, unvaccinated animals.

Equine infectious anemia was identified in 16 horses on three premises in southeastern France.

Outbreaks of piroplasmosis due to *Babesia caballi* and/or *Theileria parva* were reported from France, Switzerland (five cases on five premises), Turkey (two cases on two premises), the United Arab Emirates (limited outbreaks), South Africa (multiple cases, one outbreak), and the USA (seven cases on one premises).

Thirteen cases of abortion meeting the diagnostic criteria for Mare Reproductive Loss Syndrome (MRLS) were reported from Kentucky between May 5 and June 15: seven late-term abortions and six early fetal losses. Multiple breeds were affected; several affected farms reported significant numbers of Eastern tent caterpillars concurrently with MRLS.

Recurrence of vesicular stomatitis (New Jersey serotype) was reported from the USA in June. Isolated cases of the disease were confirmed in equines on one premises in New Mexico and three in Texas. The USA also reported cases of Eastern equine encephalomyelitis in Florida, Georgia, and Louisiana.

Switzerland confirmed single cases of anaplasmosis (*Anaplasma phagocytophila*) and borreliosis (*Borrelia burgdorferi*) on separate premises. An outbreak of leptospirosis was reported from Turkey, characterized by mild disease in three Thoroughbreds on two premises. South Korea confirmed an outbreak of enteritis due to *Clostridium perfringens* type A in foals on one premises.

Equine Disease Quarterly

Editors
Roberta Dwyer
Peter Timoney
Neil Williams

Staff
Diane Furry
Martha Jackson
Linda Millercox

Correspondence should be addressed to the editors, Department of Veterinary Science, Maxwell H. Gluck Equine Research Center, University of Kentucky, Lexington, Kentucky USA, 40546-0099
Telephone (859) 257-4757
Fax (859) 257-8542

Internet address:
http://www.ca.uky.edu/gluck/index.htm

NATIONAL

Nitrate Poisoning in Horses

FORTUNATELY, NITRATE/NITRITE POISONing is not a common problem in horses. However, due to serious and potentially fatal consequences of nitrate/nitrite poisoning, horse owners should be aware of the condition and understand the risk factors.

Nitrate/nitrite poisoning in animals is caused by ingestion of excessive amounts of nitrate or nitrite from forages or weeds, nitrate-containing fertilizers, or contaminated water. Ingestion of large amounts of nitrate can cause gastrointestinal irritation, colic, and diarrhea, but the most important consequence is the conversion of nitrate to the more toxic nitrite anion by gastrointestinal microorganisms. Nitrite is absorbed from the gastrointestinal tract into the blood, causing injury to red blood cells and resulting in inability of red cells to carry oxygen. Clinical signs may include difficulty breathing, weakness, tremors, ataxia, rapid heartbeat, grey/blue or brown discoloration of blood and tissues, seizures, and rapid death. Abortion can occur in animals that survive the initial clinical signs.

While nitrate/nitrite poisoning can occur in any species, ruminants are most susceptible, due to efficient conversion of nitrate to nitrite in the rumen. Non-ruminant species such as horses are much less commonly affected because they do not readily convert nitrate to the more toxic nitrite. Conversion of nitrate to nitrite occurs primarily in the large bowel in horses and is roughly one-fourth as efficient as ruminal conversion in cattle. Hence, compared to ruminants, a much larger dosage of nitrate is required to cause clinical signs in horses. However, horses are very sensitive to nitrite. Ingestion of nitrite can occur when nitrates in forages or water have been converted to nitrite by environmental microbes prior to ingestion.

Documented cases of nitrate poisoning in horses are rare. Most cases involve ingestion of nitrate/nitrite-contaminated water, nitrate fertilizer directly, or forage or hay grown in the area of a previous fertilizer spill. A few cases in horses have occurred from ingestion of high nitrate hay that was baled wet or became wet after baling. Nitrate was converted to nitrite by microorganisms in the hay, resulting in direct nitrite ingestion.

Only a few experimental studies have been published documenting effects of administration of high concentrations of nitrate to horses. No studies have been published that determine the amount of nitrate that horses can safely tolerate. However, studies suggest that horses, including pregnant mares, can tolerate considerably more dietary nitrate than can cattle.

Chronic exposure to lower levels of nitrate has not been well researched in horses. Associations between chronic nitrate exposure and infertility, poor growth, hypothyroidism, and other disorders have been claimed, but none have been experimentally reproduced in horses, and much work remains to be done.

A small amount of nitrate is normally found in all animals, including horses, as nitrate is a normal component of the plants they eat. Many factors can increase the risk of excessive nitrate accumulation in plants, including species of plant, stage of growth, fertilization practices, plant stress (drought, frost, hail, herbicide use), and many other factors. Nitrate accumulates primarily in plant stalks, less in leaves, and not in grains or fruits. Many important crop plants can accumulate nitrates, including oat plants, sorghum/sudan, and alfalfa. Nitrate-accumulating weeds include ragweeds, pigweed, and Johnson grass, to name just a few. Although high-nitrate forages and weeds pose significant risks to ruminants, horses are rarely poisoned by these plants unless they have been grown on sites of previous fertilizer spills or nitrates have been converted to nitrite by environmental microbes.

Treatment of affected animals is possible, but timing is critical, as animals can die very quickly. Prevention is key, and for horses includes the following: ensure that fertilizers are used as directed and stored safely away from animals; thoroughly clean up any spills; do not apply excessive fertilizer to pasture or hay fields; never use tanks that previously contained fertilizer to haul water, even if tanks have been washed; do not bale hay when it is too wet or allow hay to become wet during storage; and do not feed moldy or wet hay. It's important to have suspect forages or water tested for nitrate and nitrite concentrations before animals are exposed. Contact an appropriate laboratory, such as the Livestock Disease Diagnostic Center, for sampling protocols and testing services.

**CONTACT: Dr. Cynthia Gaskill,
(859) 253-0571, cynthia.gaskill@uky.edu,
Livestock Disease Diagnostic Center,
University of Kentucky.**

Antibody Titers

ONE OF THE MOST OFTEN USED AND LEAST understood immunological terms is *antibody titer*. But what does *titer* mean, and how can this information be used in assessing the immune status of a horse?

A titer is defined as the concentration of specific antibodies in the blood that recognize a particular agent, such as equine influenza virus. The titer is determined by serially diluting the serum fraction of blood and assaying (testing) each dilution for the antibody of interest (for example, equine influenza virus antibodies). The last dilution of a serum sample that responds in the assay determines the titer. The greater the concentration of the specific antibody in the serum sample, the higher the titer. For example, a titer for an influenza hemagglutination inhibition assay of 1:10 would be very low; a titer of 1:320 would be high. A low or undetectable titer indicates very little antibody present in the serum.

This information has several important uses, including the following:

- **Animal exposure to pathogen:** Prior to exposure, the antibody titer is very low or undetectable. Following exposure, the immune system produces antibodies, resulting in an increase in the titer. A rising antibody titer in paired sera samples collected two to four weeks apart provides evidence for exposure to the agent. This evidence is particularly useful when it is not possible to identify the agent, such as *Neorickettsia risticii* (Potomac horse fever).
- **Disease diagnosis:** Very high antibody titers can help diagnose purpura hemorrhagica and internal abscesses ("bastard strangles") caused by *Streptococcus equi*.
- **Vaccine efficacy:** In the case of some infectious diseases (for example, equine influenza virus), protection from infection often requires that a certain antibody titer (determined experimentally) be obtained following vaccination. This information is then used to formulate vaccines so that they stimulate the necessary antibody response and achieve the desired titer. Since antibody titers decay over time, re-vaccination is necessary to boost the titer back to these protective levels.

Can titer levels be used to determine when it is necessary to vaccinate horses? While this might seem to be more efficient, several factors preclude the use of such an approach. The major impediment is that for many infectious diseases, the protective titer is not known precisely enough to make a vaccination decision. With rabies, animals with very low or undetectable titers to the virus may actually be protected from infection, but the assay lacks sufficient sensitivity to register the immunity. In contrast, EHV-1 has no known level of antibody that accurately predicts protection.

This lack of correlation between antibody titer and protection is likely due to the fact that cell-mediated immune responses are more important in preventing some infectious diseases. Currently it is not possible to determine a numerical measure of protection provided by cell-mediated immunity.

Even for those diseases in which protective antibody titers can be determined, the time and costs associated with performing these assays currently makes this approach impractical. Further, the time-dependent decay in antibody titers following vaccination is fairly predictable, meaning that regular revaccination schedules can be developed without having to determine titers. Nevertheless, future developments in veterinary immunology may lead to an increased use of titer information in the development of vaccine recommendations.

**CONTACT: Dr. David W. Horohov,
(859) 257-4757, dwhoro2@email.uky.edu,
Maxwell H. Gluck Equine Research Center,
University of Kentucky, Lexington, Kentucky.**

DIFFERENT TESTS, DIFFERENT TITERS

Many laboratory tests result in an antibody titer level: hemagglutination inhibition (HI), serum neutralization, microscopic agglutination test (MAT), and others.

- Antibody titers cannot be compared between results from two different types of assays or two different pathogens.
- A titer of 1:320 for equine influenza virus is a significant antibody titer (HI), whereas a titer of 1:12,800 is significant for leptospirosis (MAT).

The treating veterinarian and diagnostic laboratory personnel are best at interpreting test results to provide accurate information to horse owners.

National Veterinary Stockpile

THE INTRODUCTION OF A DAMAGING animal disease like foot-and-mouth could devastate American animal agriculture, harm the economy, and, for zoonotic reasons, threaten the public's health. Having enough resources for a rapid response is crucial.

The National Veterinary Stockpile (NVS), part of the USDA's Animal and Plant Health Inspection Service-Veterinary Services, exists to provide states, tribes, and U.S. territories the resources they need to respond to 17 of the most serious animal disease threats (*see sidebar*).

Operational since 2006, the NVS holds large quantities of veterinary countermeasures that can be deployed anywhere in the United States within 24 hours. These include packages of personal protective equipment and decontamination supplies, poultry depopulation foaming units, carbon dioxide poultry depopulation carts, avian influenza vaccine for poultry, and antiviral medications for agricultural responders. Commercial support services can deploy within 24 hours to help depopulate, dispose of, and decontaminate animals.

Management of these resources during an ongoing animal disease outbreak is critical. State and local authorities should engage in a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action to achieve and maintain readiness. The APHIS NVS team assists states, tribes, and U.S. territories to plan the request, receipt, storage, control, issue, staging, and distribution of NVS countermeasures. Planning tools such as the *NVS Planning Guide for Federal, State, and Local Authorities v2* and the *Template for a State NVS Plan* are now available on the NVS Web site.

Training and exercising complement preparedness planning. Training ensures that individuals and logistics teams know what to do during a response, and exercises test their effectiveness and identify necessary improvements. The NVS team collaborates with state and tribal jurisdictions to implement and evaluate their NVS plans through discussion-based and operations-based exercises. The following states and regions have participated in NVS exercises: North Carolina (2006), Georgia (2006), Iowa (2007), Delaware (2007), California (2008), South Carolina (2008), and New England (2008). Regional NVS preparedness of the Multi-State Partnership for Security in Agriculture and Canada was evaluated in June of 2009 during four concurrent NVS deployments to Kentucky, Illinois, Nebraska, and Canada. The first USDA APHIS tabletop exercise between federal, state, and tribal partners on tribal lands will evaluate Arizona and Navajo Nation NVS planning in August 2009.

For more information, visit the APHIS NVS Web site: http://nvs.aphis.usda.gov.

CONTACT: Dr. Lee M. Myers,
301-910-7336, Lee.M.Myers@aphis.usda.gov,
USDA, APHIS, VS, Atlanta, Georgia.

NVS serious animal disease threats to the United States:

African horse sickness
African swine fever
Akabane virus
Bovine spongiform encephalopathy
Classical swine fever
Contagious bovine pleuropneumonia
Coxiella burnetii (Q fever)
Eastern equine encephalitis
Ehrlichia ruminentium (Heartwater disease)
Exotic Newcastle disease
Foot-and-mouth disease
High pathogenic avian influenza
Japanese encephalitis
Nipah and Hendra viruses
Rift Valley fever
Rinderpest
Venezuelan equine encephalitis

Note: Bold indicates diseases of horses

KENTUCKY

Leptospiral Abortions

THE YEARLY INCIDENCE OF EQUINE LEPTOspiral abortion varies based on environmental conditions, the number of susceptible horses in the population, and the frequency of contact with chronically infected animals and their waste products. Sixteen cases of equine leptospiral abortion have been diagnosed at the University of Kentucky Livestock Disease Diagnostic Center since the last update in the July 2007 issue of the *Equine Disease Quarterly*.

This report provides a brief review of cases diagnosed during the 2008 and 2009 foaling years. For reporting purposes, a foaling year is 365 days after July 1; for example, July 1, 2008-June 30, 2009 is the 2009 foaling year.

The 16 leptospiral abortions (six in 2008 and 10 in 2009) diagnosed during the 2008-2009 foaling years (Figure 1) is a substantial decrease from the 42 leptospiral abortions observed in central Kentucky during the 2007 foaling year.

Abortions occurred during the last half of gestation and were identified from October to February (Figure 2). Thirteen individual farms experienced leptospiral abortions. A single abortion was diagnosed on 10 farms, and three farms were diagnosed with two abortions each. Leptospiral abortions were diagnosed in Thoroughbred and Paint horses over this two-year time period.

Affected mares generally do not display clinical signs prior to abortion, but aborted fetuses may exhibit the following: yellow discoloration, regions of hemorrhage, enlarged kidneys and liver, and placental lesions. A diagnosis of leptospiral abortion can be made based on pathologic lesions and at least one of the following: a positive culture, detection of leptospiral DNA by polymerase chain reaction, fetal serology, visualization of the bacterium by a fluorescent antibody test, silver stain, or immunohistochemistry. A high antibody titer greater than or equal to 1:12,800 in a mare that has recently aborted is also highly suggestive of leptospiral abortion.

Leptospirosis remains an important cause of equine disease and abortion worldwide. Historically, serovar Kennewicki is most commonly associated with abortion in central Kentucky; however, serovar prevalence varies by country and region. Leptospirosis should be considered as a differential diagnosis in fetuses aborted from mid- to late gestation, stillborn fetuses, or weak-born foals. No licensed vaccine is available for horses.

**CONTACT: Dr. Alan Loynachan,
(859) 253-9571, alan.loynachan@uky.edu,
Livestock Disease Diagnostic Center,
University of Kentucky, Lexington, Kentucky.**

Equine Disease Quarterly Newsletter

Department of Veterinary Science
Maxwell H. Gluck Equine Research Center
University of Kentucky
Lexington, Kentucky 40546-0099

Address Service Requested

Figure 1

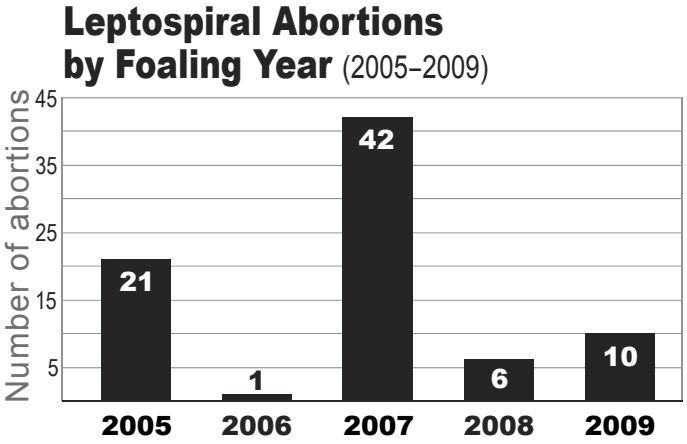

Figure 2