EQUINE DISEASE QUARTERLY

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COMMENTARY

IN THIS ISSUE

More than 100 land-grant colleges and universities have Extension educators who bring research-based information to agricultural producers and the public, including horse owners. Over the last decade, the university specialists and educators involved with both equine science and disaster education (preparedness, mitigation, response and recovery) have made significant collaborative strides in developing and publishing resource information. These efforts include materials on three different platforms: eXtension (the national Extension website: http://learn.extension.org), My Horse University (a collaborative effort between university equine specialists: www.myhorseuniversity.com), and the Extension Disaster Education Network (EDEN) (collaboration of disaster educators across the United States: www.eden.lsu.edu).

Webinars on animal disaster preparedness and biosecurity are available on eXtension and My Horse University (enter "disaster" in the search engines), along with a wealth of other equine and livestock information. The EDEN website is an extensive information hub that has disaster-specific information (e.g., drought, hurricanes, tornadoes, animal disease), as well as resources for communities, families, and children dealing with disasters.

A notable effort has been the EDEN Strengthening Community Agrosecurity Preparedness (S-CAP) program, which is a two-day course that facilitates emergency managers and agriculture/livestock owners to evaluate vulnerabilities within counties and develop enhanced agrosecurity plans to address local needs. This process almost always includes establishing response and evacuation guidelines for equine owners. To date, 48 S-CAP workshops have been conducted, which represent 24 states, 285 counties, and 23.7 million residents.

Universities and partners are incorporating rural readiness into disaster readiness curricula, which includes specific materials focused on equine issues before, during, and after disasters strike. Beneath the surface of many of the partnerships you will find delegates from EDEN developing, publishing, and collaborating on new materials on a regular basis.

It is imperative that information and resources for horse managers during disasters is both research-based and refereed by experts and civic authorities for validity. With the popular nature of horses internationally, valid information that is readily available is critical when crucial incidents are impending or ongoing. No equine manager can afford to be basing response on "popular" or "web-based" practices or materials during a crisis. In most cases equine managers will have an average of 30 minutes to 2 hours to prepare for a disaster, although in some cases it can be as little as 15 minutes. During two floods and seven wildfires in the western United States it took an average of 15 minutes per horse to respond to disaster if the responders were already equipped and organized. If not ready, the average was closer to one hour per horse.

For those reasons equine managers should have a disaster plan, equipment, personnel, evacuation routes, emergency supplies, first-aid kits, and emergency contact information ready at all times. The eXtension, My Horse University, and EDEN resources can help utilize the hard-earned, factual knowledge developed by professionals to reduce impacts from disasters. Remember: Having a plan can save human and animal lives.

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INTERNATIONAL

Second Quarter 2015*

The International Collating Centre, Newmarket, United Kingdom, and other sources reported the following disease outbreaks.

Vesicular stomatitis reoccurred in the USA in late April 2015. Infection with the New Jersey serotype of the virus had spread to 25 premises in Arizona, Colorado, New Mexico, Texas, and Utah.

A donkey that strayed across the border from Mexico into Texas, USA was reported as testing serologically positive for glanders. The animal was one of a group of five, all of which were clinically normal. With the one exception, the remaining donkeys were seronegative for antibodies to *Burkholderia mallei*. The positive donkey, whose status was downgraded to suspect on re-test, was euthanized.

Several outbreaks of strangles were reported in Denmark, France, Germany, Switzerland, United Arab Emirates (UAE), and the USA.

Equine influenza was reported by Germany (single cases on four premises), the UK (seven outbreaks including some animals recently imported), and the USA (outbreaks in four states).

Equine herpesvirus-1 and -4 (EHV-1, -4) related diseases were reported in France, Germany, Ireland, Japan, Switzerland, the UK, and the USA. Respiratory disease was recorded by France (three outbreaks), Germany (two cases), Ireland (three cases), and the USA (several states). Abortion due to EHV-1 was confirmed by France (three outbreaks), Germany (nine cases), Japan (seven cases of abortion and three deaths in neonatal foals on seven premises), the UK (one case), and the USA (three cases). EHV-1 neurologic disease was reported by Germany (two cases) and the USA (outbreaks in seven states, the majority involving isolated cases of the disease). Respiratory disease due to EHV-4 was recorded in France (11 outbreaks), Germany (three cases), Switzerland (one case), and the UK (five outbreaks, one involving multiple cases). The UK also reported one case of EHV-4 related abortion.

Two cases of equine coital exanthema were diagnosed in the UK.

Germany confirmed equine arteritis virus infection in two stallions on separate premises.

A single case of equine adenoviral respiratory infection in a foal was reported in the USA.

Outbreaks of equine infectious anemia were recorded in Canada, France, and the USA. A total of 16 cases of the disease were diagnosed on nine premises in four westernmost provinces in Canada. A single case was identified in France and three cases on different premises in the USA.

France and the UAE reported that equine piroplasmosis was endemic; Switzerland confirmed one case of the disease.

Contagious equine metritis was diagnosed in three horses on separate premises in Germany.

The USA reported isolated cases of nocardioform placentitis and abortion in two states and a single case of mare reproductive loss syndrome in Kentucky.

Outbreaks of salmonellosis were confirmed in the USA, some due to Group B *Salmonella* spp. and others to Group C1 *Salmonella* spp. France reported five outbreaks of rotavirus infection in foals. Clostridiosis in foals was recorded in the USA, several associated with *C. perfringens* Toxin Type A and others with *C. difficile* Toxin A/B gene strains.

Nine cases of Eastern equine encephalomyelitis were diagnosed in the USA, the majority in Florida, four of which had not been vaccinated against the disease. The USA also reported one case of West Nile encephalitis in a horse in Oklahoma.

Rhodococcal related disease was recorded in Switzerland (single case) and the USA (numerous cases in multiple states in which the disease is endemic).

Isolated cases of other diseases were reported: Tyzzer's disease (single case in a foal in the USA), melioidosis (single case in a riding-school horse in Singapore), cutaneous leishmaniasis (single case in Switzerland), and anaplasmosis (two cases in Germany).

**First Quarter Report from Australia*

Equine Disease Quarterly

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Getah Virus: Significance as an Equine Pathogen

An outbreak of illness at a Japanese racing stable in the latter half of 2014 re-awakened awareness of Getah virus and its potential as an equine pathogen. The first indication that the virus could cause illness in horses was the widespread occurrence of a disease syndrome among racehorses at two training centers in Japan in 1978. Subsequently, the virus was implicated in a clinically similar disease outbreak on a Thoroughbred breeding farm in India during 1990.

Getah virus is a mosquito-borne arbovirus that is a member of the genus *Alphavirus*, family *Togaviridae*. First isolated from mosquito pools collected in Sarawak (Malaysia) between 1968 and 1970, Getah or one of its antigenically related viruses, can be found over a wide geographic range extending from Eurasia to Australia. Results of serologic surveys have confirmed infection in humans and a wide diversity of domestic and wildlife animal species wherever the virus is present. Serologic evidence of Getah virus activity in horses in Japan can be traced back to 1961. Subsequent studies have shown that the infection was widespread in equine populations throughout that country. Notwithstanding this fact, however, disease events caused by Getah virus have been very infrequent.

Naturally occurring disease caused by Getah virus has only been reported in horses and in swine. While the vast majority of primary infections in horses are asymptomatic, on occasion the virus can give rise to extensive outbreaks of mild illness characterized by fever, anorexia, serous nasal discharge, hind limb edema, stiff gait, scrotal edema, submandibular lymphadenopathy, and urticarial skin rash. Affected horses may develop some or all of these clinical signs. Regardless of severity, the disease is non-fatal and complete clinical recovery occurs within 7 to 14 days. Symptomatic treatment is seldom indicated. Based on the outbreak recorded in India, there was no evidence that Getah virus is abortigenic in the pregnant mare or that infection can result in congenital abnormalities in foals.

The only other animal species in which Getah virus has been implicated in causing disease is swine. The virus has been isolated from newborn piglets that died of peracute disease and also from dead fetuses removed from a naturally infected sow.

Getah virus is primarily a mosquito-borne infection that is transmitted by different species of *Culex* and *Aedes* mosquitoes depending on the geographic region of the world in which it occurs. Swine are thought to play a role in amplification of the virus in endemic areas. The potential for transmission through direct horse-to-horse contact cannot be discounted considering some acutely infected horses shed significant quantities of infectious virus into the respiratory tract.

Diagnosis of Getah virus infection can be readily accomplished by virus detection in nasal swabs, unclotted blood (buffy coat) samples, and saliva either by PCR assay or virus isolation. It can also be confirmed by serological testing of acute and convalescent serum samples. Because of the close clinical similarity between Getah virus infection and equine viral arteritis and African horse sickness, it is important to differentiate it diagnostically from either of these two diseases.

Prevention and control of Getah virus infection is based on measures to reduce mosquito contact with horses and, optimally, vaccination of at-risk equine populations in countries in which the virus is endemic.

While Getah virus is not considered an important equine pathogen, it can be significantly disruptive when extensive outbreaks occur.

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Figure 1. States with Equine EEE Cases, 20

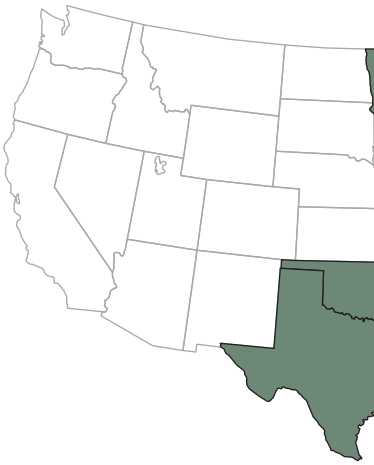


Figure 2. Reported U.S. Equine EEE Cases.

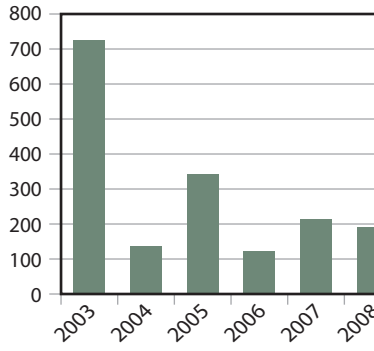
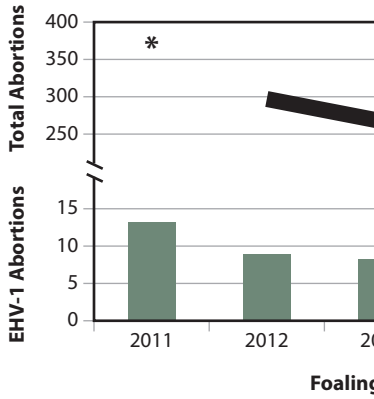
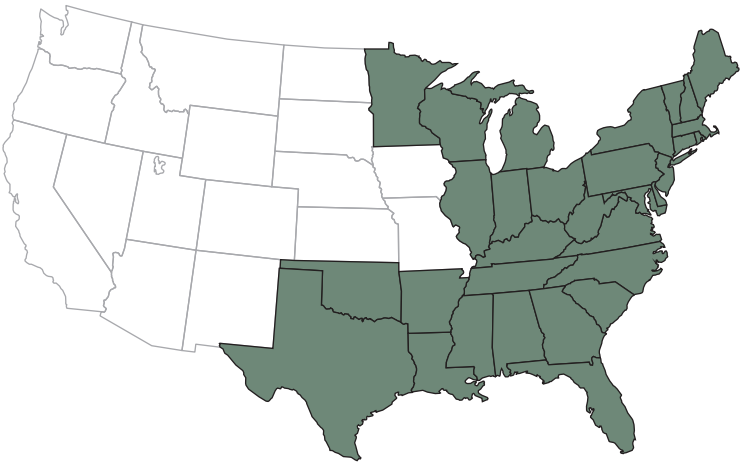


Figure 3. Abortions submitted to UKVDL,



** Submissions for 2011 were subs*
number of cases.

Figure 1. States with Equine EEE Cases, 2003-2014.



Adapted from www.aphis.usda.gov

Figure 2. Reported U.S. Equine EEE Cases.

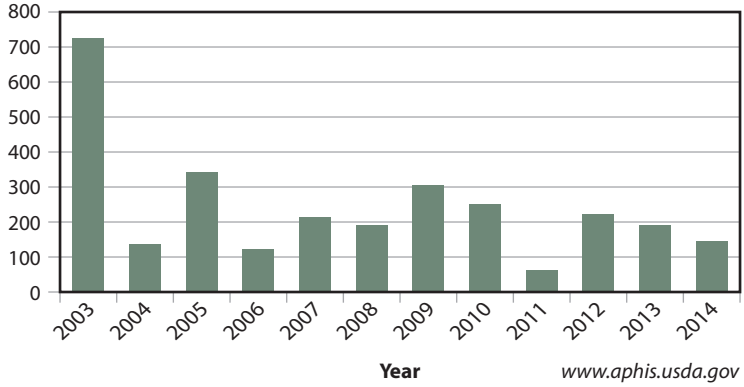


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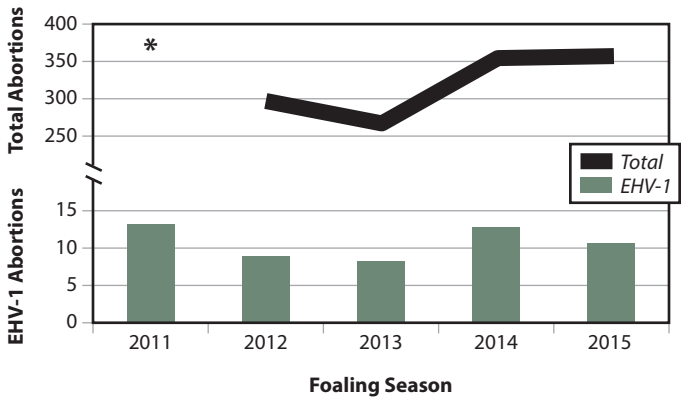
Figure 3. Abortions submitted to UKVDL, 2011-2015.



** Submissions for 2011 were subsidized, resulting in an inflated number of cases.*

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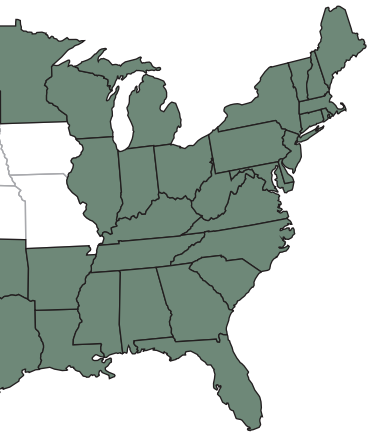

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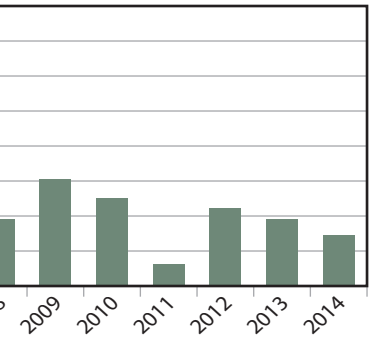

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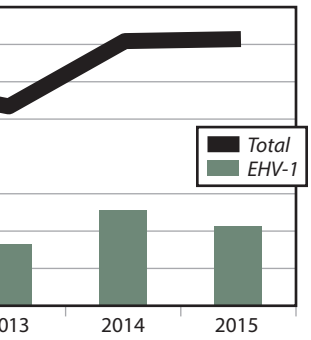

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Eastern Equine Encephalomyelitis

Eastern equine encephalomyelitis (EEE) is only one of several important vector-borne diseases that is of significant concern to horse owners. With a mortality rate of 90%, it is a deadly disease. The U.S. Department of Agriculture Animal and Plant Health Inspection Service, Veterinary Services works with the U.S. Centers for Disease Control and Prevention and public health officials to collect data on EEE and other vector-borne diseases.

Figure 1 shows the geographic location (shaded states) of equine EEE cases from 2003-2014, although not every state had cases each year. Figure 2 shows reported U.S. equine EEE cases (which include presumptive positive and confirmed positive cases) from 2003-2014.

Despite the geographic distribution of equine EEE cases, the rapid interstate and international transportation of horses for show, racing, recreation, sales, breeding, and other activities strongly supports the use of EEE vaccines. The EEE vaccine is considered by the American Association of Equine Practitioners to be a "core" vaccine.

Insect control and appropriate use of approved insecticides are critical to reducing the risks of EEE as well as West Nile virus infections, vesicular stomatitis, and other insect-borne diseases.

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Anhidrosis

Anhidrosis is a common condition that frequently presents during the long, hot days of summer and is the inability of the horse to produce an adequate amount of sweat. The decreased ability to maintain proper body temperature limits athletic potential, increases risk for heat stroke, and may compound other disease processes. The cause of anhidrosis is not well defined, but is believed to involve over-stimulation of the horse's sweat glands by stress hormones, typically occurring in the summer months. A horse may only have minor decreases in sweat production, resulting in subtle clinical signs, or a total loss of sweat production and severe signs of hyperthermia. Most commonly diagnosed in performance horses, it also affects non-performance horses and seems to be more prevalent in dark-colored animals. Anhidrosis can be especially problematic in animals with coexisting medical diseases (e.g. metabolic or respiratory conditions) by increasing cortisol levels and respiratory demands.

The most common form seen is incomplete or partial anhidrosis and should be considered if a decline in performance with an increase in ambient temperature during summer months occurs. A complete history and clinical examination following exercise may be adequate to arrive at a diagnosis. Clinical signs of partial anhidrosis include an elevated respiratory rate and increased rectal temperature that requires an extended period of time (greater than 30 minutes) to return to the normal range upon cessation of exercise.

Chronic cases of anhidrosis typically present with a poor, dry-looking hair coat accompanied by a history of lethargy during the hotter times of the year. It should be noted that any horse may suffer from anhidrosis in the summer months, including brood mares and retired performance horses with more sedentary lifestyles. Affected horses will have an elevated respiratory rate at rest and will tend to seek shade if available.

A definitive diagnosis of anhidrosis can be made by injecting a series of dilutions of terbutaline. This may be useful in determining severity of the condition and evaluating response to treatment. Blood work, including an electrolyte analysis, may also be helpful in formulating a treatment plan. Lastly, a skin biopsy may be performed in severe cases to evaluate the histologic structure of the sweat glands, however, this is rarely necessary to confirm a diagnosis.

There are some treatment options for anhidrosis, and what works on one horse might not work on another. Until the horse with anhidrosis is suc-

cessfully medicated, it should have limited intense exercise during the heat of the day and should be accommodated in facilities that minimize an increase in body temperature by providing shade, movement of air, misters, or even cold-water hosing. The simplest of treatments is supplementation with electrolytes based on abnormalities identified by the blood chemistry combined with environmental management. As a last resort for cases that do not respond to conventional therapies, moving the horse to a geographically less hot and humid climate may eventually restore its ability to sweat.

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Manifestations of Equine Herpesvirus–1

Equine herpesvirus-1 (EHV-1) is one of five herpesviruses commonly found in horses. EHV-1 infections manifest in three syndromes: respiratory, reproductive, and neurologic. Like other herpesviruses, EHV-1 can establish latent infections, making it possible for outbreaks of disease to occur in herds that are considered closed. While quarantine of new arrivals, segregation of young stock, breeding stock and show stock, and vaccination are important management tools in the prevention of EHV-1 infections, complete protection is not possible to achieve. Vaccination confirms relatively short-term immunity (4-5 months) and immunity is not entirely protective, meaning that even well-vaccinated horses can develop disease.

The respiratory form of EHV-1 is generally mild and self-limiting. Clinical signs are indistinguishable from other viral causes of respiratory disease, such as equine influenza and EHV-4. Horses exhibit a fever, cough, serous nasal discharge, and mild lethargy.

Reproductive disease is generally considered to be the most economically important manifestation of EHV-1. Infection with EHV-1 causes abortion in the last trimester of gestation. Affected foals are occasionally born alive but are generally very weak and succumb within days of birth, often with secondary disease conditions. The virus infects the mare through the respiratory tract and then enters the bloodstream (viremia), traveling to and infecting the fetus. Infection in the mare is generally inapparent and abortion occurs without any signs of impending parturition. The fetus is aborted fresh, in contrast to other causes of abortion such as leptospirosis where the fetus may be significantly decomposed.

Following any abortion, the mare should be isolated, fetal tissues should be contained and submitted to a diagnostic laboratory, and in-contact mares should not be moved nor should new mares be brought in until a diagnosis has been rendered. Fetal tissues and uterine fluids should be considered infectious, and contaminated areas should be cleaned with detergent and disinfected. Contaminated bedding should be bagged and discarded and not spread on pastures.

In the case of EHV-1 abortions, the fetal tissues and fluids contain high concentrations of virus; infected foals and mares also shed virus via the respiratory route. EHV-1 is transmitted via the respiratory route and fomites. However, since it is an enveloped virus, herpesvirus is readily inactivated by thorough cleaning with detergents followed by disinfectants. Biosecurity and restricted movement of horses are important in containing EHV-1 infections.

Laboratory diagnosis relies on gross and histologic examination in conjunction with laboratory testing. Gross lesions can include pleural and peritoneal effusion, over-expanded lungs with rib impressions and small white foci scattered throughout the liver. However, there are many cases in which lesions are not identified at necropsy. Histologically, EHV-1 produces necrotizing lesions in a number of organs, most notably the lung and

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liver. Characteristic intranuclear inclusion bodies are frequent. Common ancillary tests for detection of the virus include fluorescent antibody testing, virus isolation, and polymerase chain reaction testing.

EHV-1 abortions can occur singly or may spread rapidly in a susceptible population, leading to the classic "abortion storm." With improved management and readily available vaccines for EHV-1, the number of cases of EHV-1 abortion has declined dramatically over the past 30 years, with the vast majority of cases being single events. EHV-1 confirmed abortions diagnosed at the University of Kentucky Veterinary Diagnostic Laboratory are shown in Figure 3. During that same time, EHV-1 neonatal deaths were diagnosed in 2011 (one), 2012 (two), and 2014 (one).

Respiratory and reproductive manifestations of EHV-1 are well-documented and have long been recognized. While viral latency and the production of a vaccine that produces long-term immunity and confirms better protection continue to be studied, these syndromes are well understood.

A manifestation of EHV-1 that is less understood is equine herpesvirus myeloencephalopathy (EHM). EHM is a neurologic disease that manifests with acute onset ataxia or paresis, often accompanied by weakness, urinary incontinence, poor tail and anal tone, and tail elevation, either singly or in combination. EHM can occur as a sporadic case of neurologic disease, but often manifests as an outbreak within a single population of horses. Outbreaks are often identified in dense populations of horses, such as at racetracks, horse shows or show barns, riding stables, etc. Generally, these horses are well-vaccinated and vaccination seems to be neither protective nor a risk factor. While the pathology of EHM is well-understood, the production and development of disease is not and is the subject of continued research. Prevention of outbreaks of EHM relies on close observation of the horses, including monitoring of rectal temperatures, swift isolation of affected horses, and often quarantine of the premises.

A constant presence in the horse world, EHV-1 is well known, but many challenges remain.

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