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Equine Disease



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Commentary

IN THIS ISSUE

Commentary

INTERNATIONAL 2

First Quarter 2001

NATIONAL 2

West Nile Virus
Surveillance
Equine Rabies 1999

KENTUCKY 5

Mare Reproductive Loss
Syndrome* (MRLS)

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LLOYD'S

Despite increasing urbanization and suburbanization of the Western hemisphere, disease issues in animal agriculture have received more media attention in the past year than for most of the previous half-century. Both print and broadcast venues provide daily progress reports of animal disease outbreaks in other countries.

The heightened awareness results from imminent threats to our own animal populations, concerns about food safety, trade sanctions for animals or animal products, and restrictions in travel to chosen destinations. Reports of the personal and financial losses incurred by individual owners and agribusiness are sobering.

Next to humans, horses are the most "frequent flyers" in international travel, with hundreds of horses imported through USDA quarantine centers each week. Concerns about importing foreign equine diseases are real, and recent examples of horses arriving in the U.S. infested with screwworms or infected with contagious equine metritis (CEM) illustrate that we are vulnerable to importation of disease.

Foot-and-mouth disease outbreaks remind us that non-equine diseases can severely impact the equine industry when horses may serve as fomites for the infectious agent.

The plethora of mechanisms by which foreign equine diseases can be transmitted, combined with the economic benefits of international trade, precludes adaptation of isolationist tactics or a "zero risk" philosophy. For example, the infectious source for the initial cases of West Nile encephalitis in the U.S. has not been identified.

Nonetheless, the spread of this agent in U.S.

mosquitoes, birds, and horses serves as an example of what can happen when a pathogen encounters naive populations.

Science-based efforts are made to ensure that we are not importing diseases along with horses. For example, the length of quarantine for horses arriving from countries known to have Venezuelan equine encephalomyelitis (VEE) is longer than that for VEE-free countries to permit manifestation of signs during quarantine if an infected horse arrives.

All overseas horses are tested at the USDA's National Veterinary Services Laboratories, Ames, Iowa for equine infectious anemia, piroplasmiasis, dourine and glanders; quarantine release occurs only after tests are completed and results are negative. Special quarantine stations are used for post-import testing for CEM.

Import procedures are adjusted when indicated to provide additional safeguards. Coping with recent disease situations at home and abroad have actually had some positive outcomes. Veterinary laboratories are upgrading to permit work with agents requiring higher biosafety containment. Communication among professionals in veterinary, public health, wildlife, and vector abatement jurisdictions has been enhanced nationally and the need for cross-sectional disease surveillance activities is recognized.

The most important benefit is the loss of complacency among everyone involved in animal agriculture. ■

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International



National

First Quarter 2001

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

Cases of foal morbidity and mortality within 48 hours of birth attributable to *Clostridium perfringens* type A were diagnosed in central Kentucky during March. Clinical signs included bloody diarrhea and acute colic.

Abortion caused by equine herpes virus type-1 (EHV-1) was reported from Japan, United Kingdom, and Kentucky, U.S.A. Between September 2000 and April 2001 there were 25 cases on 21 Thoroughbred farms in central Kentucky. Several foals were born alive but died within five days of birth. Respiratory disease attributable to EHV-1 and EHV-4 was diagnosed among Thoroughbred and non-Thoroughbred animals in France and the paralytic form was recognized in a stable of riding and driving horses in Switzerland.

Equine arteritis virus (EAV) was isolated from 7 stallions of unspecified breed in Switzerland. Equine influenza was reported from France and Sweden.

Thirty-four cases on 24 premises of *Leptospira* abortion were recorded in central Kentucky, primarily during November and December. The majority were identified as *Leptospira* serovar *kennewicki*.

A number of horses in Victoria, Australia had positive titres for Ross Valley Fever. Strangles cases were reported from Australia, Sweden, Switzerland, and Kentucky, U.S.A. A fatal case of Tyzzers disease caused by *Bacillus piliformis* was confirmed in a 2-week-old foal in Switzerland.

There were no reports of West Nile virus isolations in the U.S.A. during the first quarter of 2001. However, up to June 12, the virus was identified in 12 dead crows and one mosquito pool in New Jersey, 3 crows in Maryland, 2 crows in Connecticut, and 1 in New York. ■

West Nile Virus Surveillance

West Nile virus, a flavivirus, has now been found in twelve states (Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, Vermont, and Virginia) and the District of Columbia.

Although this virus occurs sporadically in Africa, Asia, Europe, and other parts of the world, it had not been isolated in the United States until the late summer of 1999. The severity of the epizootic, causing deaths in humans, horses, and thousands of crows and other bird species, launched a national effort to improve surveillance of arthropod-borne diseases.

West Nile is an arthropod-borne virus. Birds are the reservoir hosts and various mosquito species, primarily *Culex* species, are the vectors. People, horses, and other mammals are incidental hosts and not contributory to the spread of infection.

The West Nile virus is capable of causing a fatal neurologic disease in humans and horses. Ongoing research projects may shed new information on the maintenance and transmission of this virus among birds, mammals, other mosquito species, and possibly ticks.

Based on available data, 60 equines were diagnosed with clinical West Nile virus in 2000. Thirty-seven survived and 23 (38%) died or were euthanized. These horses were from 7 of the northeastern states listed above. The youngest affected horse was four months of age.

There is no vaccine available for equines at this time. The most important mechanism to prevent a mosquito-borne disease like West Nile virus is source reduction: the elimination of stagnant water sources where mosquitoes may breed.

More aggressive measures, such as insect-proofing stables and individual animal treatment would be prudent once West Nile virus is isolated from mosquitoes, birds, humans, or horses in an area.

The Kentucky Department for Public Health (KDPH) is coordinating surveillance efforts statewide in cooperation with the Department of Fish and Wildlife (DFW), the Kentucky Department of Agriculture, the United States



Equine Disease Quarterly

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Department of Agriculture (USDA), the animal disease diagnostics laboratories, and veterinarians.

Bird mortality surveillance has been the best sentinel for tracking the movement of West Nile virus in the United States and will be the primary focus in 2001. The DFW investigated 170 dead bird reports in 2000, with 23 specimens submitted for West Nile virus testing, all being negative.

Persons who find sick, injured, or dead birds, especially crows or blue jays, are encouraged to report them to the DFW, USDA, or KDPH so a determination can be made on submission of the birds for West Nile testing.

The two animal disease laboratories in Kentucky will be assisting with the dead bird surveillance through federal grant funding. Also, mosquito surveillance will be in effect in the Louisville and Lexington areas this year, with plans to expand it over the next several years to more areas in the state.

Equine surveillance is essential for economic reasons and for the horse's potential as a sentinel animal, especially in rural areas. The surveillance case definition for West Nile virus in horses states that the clinical signs in horses must include ataxia or at least two of the following: circling, hind limb weakness, inability to stand, multiple limb paralysis, muscle fasciculation, proprioceptive deficits, blindness, lip droop/paralysis, teeth grinding, or acute death.

The Animal and Plant Health Inspection Service (APHIS) has developed specific guidelines to follow for investigations of equine exhibiting neurological symptoms, and the animal disease diagnostic laboratories in Kentucky are available for pathology and other laboratory services.

West Nile virus activity in 2001: As of June 12, New Jersey has reported 12 dead crows and one mosquito pool positive for WNV; Maryland, 3 dead birds; Connecticut, 2; and New York, 1. ■

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Equine Rabies 1999

According to the Centers for Disease Control and Prevention (CDC), rabies remains a threat to domestic animals and people in the United States, despite a decrease in incidence of 11.2% in animals from 1998. During 1999, 7,067 cases of rabies were reported from the continental U.S. and Puerto Rico, with 65 cases reported among horses (*Figure 1*).

Wildlife accounted for 91% of the cases, with raccoons remaining the major player, due in part to the continuing epizootic of raccoon rabies on the East Coast and in the southeast U.S. The geographic hindrances of the Ohio River and the Appalachian Mountains in the south have historically provided a barrier to the spread of raccoon rabies. However, northeastern counties of Ohio have reported cases of rabies in raccoons, resulting in aggressive efforts of rabies vaccine baiting in affected areas in that state.

Bat rabies has occurred in all continental states, and evidence from human cases of rabies due to bat exposure indicates that the bite of a bat is considered almost undetectable and similar to an insect bite. Due to lack of routine testing of animal brains to detect the specific rabies variant, it is unknown how many cases of equine rabies are due to bats. Documented cases of equine rabies cases due to the bat variant exist in Kentucky and Idaho, both states where skunk rabies predominates.

Of equine rabies cases, 35 of 65 cases were reported from New York, North Dakota, Oklahoma, South Dakota, and Texas. The numbers of cases reported here are the minimum number of cases in 1999; not all neurologic horses are necropsied and tested for rabies.

2000 Update—Raccoon rabies continues to push westward into West Virginia, closing in on the borders of Kentucky and Tennessee. From 0 human rabies cases in 1999, 5 cases occurred in 2000 in California, Georgia, Minnesota, New York, and Wisconsin, as well as one in Quebec, Canada. One of the six was due to canine rabies likely obtained from a dog bite while the patient was overseas; all other cases were due to bats.

Kentucky Rabies Cases—Kentucky rabies cases in 2000 are found in *Figure 2*. As of May

Figure 1.
U.S. Cases of Rabies in Horses
Total Cases

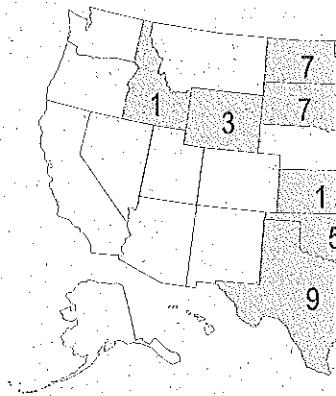
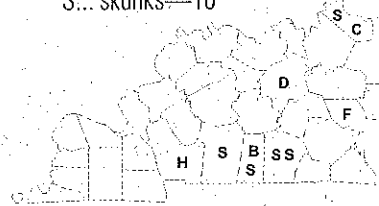


Figure 2.
Cases of Rabies in Kentucky—2000

- B... bats—4
 - C... cattle—1
 - D... dogs—4
 - F... fox—1
 - H... horse—1
 - S... skunks—10
- 21 Total



15, 2001, the only equine rabies case was from Breckinridge County.

Prevention Reminders

- Vaccinate horses yearly for rabies. The vaccines are quite safe against a disease that is 100% fatal.
- Vaccinate dogs and cats on horse farms, including barn cats.
- Do not build bat houses near animal or human dwellings.
- If bats pose a problem to barn or home locations, contact a professional to clean the areas and make them bat-proof.
- Do not translocate wildlife to other areas or states; report such known activities to state officials. ■

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Kentucky

Mare Reproductive Loss Syndrome (MRLS)

The recognition of a "new" syndrome (MRLS) among pregnant mares in central Kentucky toward the end of April and early May 2001 created reverberations throughout the equine industry. The following is the most up-to-date

information as of June 12, 2001.

During the first two weeks of May, veterinary clinicians reported an increased incidence of separate cases of pericarditis and unilateral panophthalmitis among a wide age range of horses and breeds. Twelve necropsied cases of pericarditis have been examined at the LDDC. A range of tests has been performed and further tests are underway to identify the cause of these conditions and clarify the link to MRLS.

Distribution

Cases of MRLS have been widely reported throughout Kentucky among all breeds of horses. Reports received from contiguous and other states north of Kentucky indicate MRLS also may be occurring in those areas. The incidence of LFL was highest during the first two weeks of May, based on submissions to the Livestock Disease Diagnostic Center (LDDC). Similarly, the incidence of EFL was highest during the same period among barren and maiden mares bred during February and early March. Subsequently, the incidence of LFL and EFL has fallen. It is estimated that 5% of the 2001 Thoroughbred foal crop produced in Kentucky has been lost and approximately 20% of the foal crop for 2002.

Pathological Findings

All virological tests have proved negative to date. Although *Streptococcus* and *Actinobacillus* species have been isolated from a high proportion of LFL cases examined at the LDDC, they are considered secondary invaders following the primary insult. Gross and histopathological lesions indicate a constant pattern in the fetus

Clinical Signs

Two reproductive entities have been identified with MRLS — late or close-to-term losses (LFL) and early pregnancy losses (EFL).

Signs associated with LFL include:

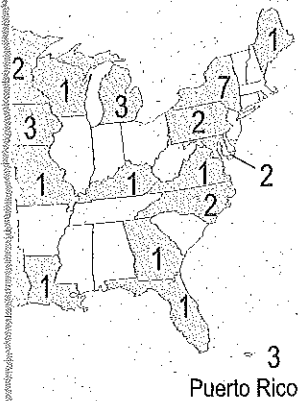
- Delivery from 1 month premature to after the "due" date, sometimes but not always associated with agalactia and dystokia.
- "Red bag" deliveries may be a feature but not always.
- Foals born alive are sometimes weak, suffering respiratory distress, and require intensive veterinary care.

Signs associated with EFL include:

- Occurrence post 35 days breeding and prior to 100 days.
- Palpation may indicate a normal pregnancy but ultrasound examination reveals abnormal ecogenic fluid (cloudy and flocculent) around the fetus. This is followed by fetal death and expulsion.

Mules 1999

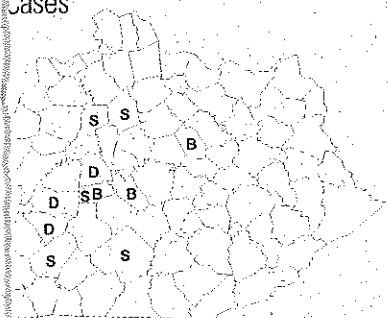
—65



- 3

Puerto Rico

Cases



and amniotic sac of the placenta. Fetal lungs show evidence of intrauterine toxic insult and inflammation, as does the amniotic sac.

Necropsy examinations of pericarditis cases reveal the pericardium is completely covered with grape-sized bright yellow fibrinous nodules. The eye condition involves hemorrhage followed by fibrin deposition.

Fetal tissue samples were submitted from the LDDC on May 17 to the toxicology laboratory at the College of Veterinary Medicine, University of Illinois. Results received on May 24 indicated low levels of cyanide or a cyanide-containing compound in fetal heart tissues.

Possible Factors Contributing to MRLS 2001

Weather data provided by the University of Kentucky Department of Agricultural Engineering for the month of April confirmed severe frosts on the nights of April 17 and 18. The month overall had experienced low rainfall. Temperatures through the month had been higher than normal, providing ideal conditions for pasture growth. This was an exact replica of weather data observed during April 1981 when a similar syndrome was reported in central Kentucky, although the cause was not identified.

The last two weeks of April also saw massive numbers of the Eastern Tent Caterpillar, which feeds on the leaves of the wild black cherry tree. Investigations revealed a considerable number of cherry trees, a source of cyanogenic compounds, in pastures containing mares that had experienced high numbers of EFL and LFL.

Confirmation of the Cause of MRLS 2001

Additional equine tissues are being examined to confirm the presence of cyanide. The possibility that caterpillars may be a source of cyanide exposure to horses is being examined in depth. In addition, the investigation of other possible causes including mycotoxins, fungal endophytes, phytoestrogens, chemical compounds, and infectious agents is still underway, although results to date provide no evidence that they are involved in the cause of MRLS. A detailed epidemiological survey of 150 horse farms was begun May 30 to identify contributing risk factors. ■

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Time Line

April 26-May 1—Field reports from veterinarians indicate abnormally high numbers of early fetal losses (EFL) between 40 and 80 days based on ultrasound examination.

April 26—Two farm visits by Gluck Center faculty during the afternoon identify magnitude of problem. The Livestock Disease Diagnostic Center (LDDC) reports a significant increase in the number of late fetal losses (LFL) submitted for examination.

May 3—Gluck Center faculty meets with equine practitioners, farm managers, and pasture consultants to define problem and determine course of action.

May 4-6—Veterinarians report EFL cases on an increasing number of farms and accessions of LFL to the LDDC rise significantly. A memo is sent by fax to equine practitioners alerting them to the situation.

May 7—Meeting at the Gluck Center to coordinate investigation and survey sent by the Kentucky Thoroughbred Farm Managers Club to local horse farms to determine more accurately the extent of the syndrome. The media publishes the first reports.

May 8—Press conference is held at the Gluck Center. Web site is established (<http://www.uky.edu/Agriculture/VetScience/mrls/>).

May 9—Equine practitioners and Gluck Center faculty meet with state and federal veterinarians.

May 10—Those involved in the investigation split into 6 groups with specifically identified tasks and team leaders.

■ Investigation of syndrome — *Dr. Thomas Tobin*

■ Field epidemiology — *Dr. Roberta Dwyer*

■ Field sampling — *Dr. Jimmy Henning,
 Roger Allman*

■ Animal sampling and pathology —

Dr. Lenn Harrison

■ Finance and liaison — *Dr. Peter Timoney*

■ Communications — *Dr. Carla Craycraft*

Dr. David Powell is responsible for coordination of the activities. A meeting to present information on progress of the investigation is held at the

Keeneland Sales Pavilion in the evening; more than 1,000 individuals attend.

May 11—Horse owners and equine practitioners from states north of Kentucky report cases similar to MRLS.

May 14—Co-ordinating group meets at Gluck Center to consider new information, including weather data from 1981 when a similar syndrome occurred. Daily briefings made available on Web site.

May 19-20—Discussion focuses on the possible role of the Eastern Tent Caterpillar.

May 21—Dr. Tobin's group meets and is apprised of negative results with respect to mycotoxins and ergot alkaloids in pasture samples. Field observations indicate a correlation with the presence of wild cherry trees and pasture grazed by mares affected with MRLS.

May 23—Dr. Harrison is informed by telephone that fetal tissues submitted to the toxicology laboratory at the College of Veterinary Medicine, University of Illinois are positive for cyanide.

May 24—Dr. Tobin's group discusses findings and develops studies to validate the preliminary observations with respect to cyanide as a possible cause. A second meeting is held at Keeneland to present latest findings. Veterinarians confirm the incidence of EFL has fallen, and submissions to the LDDC have also dropped over the last seven days.

May 31—Meeting of industry representatives, veterinarians, and scientists with Kentucky Governor Paul Patton at the State Capitol.

June 6—Investigators meet with equine veterinarians to discuss increased incidences of heart and eye problems.

June 11—Meeting of Kentucky Association of Equine Practitioners' (KAEP) Emerging Diseases Committee to discuss MRLS with investigators and industry representatives.

Visit our Web site for the most up-to-date information <http://www.uky.edu/Agriculture/VetScience/mrls>

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