



EQUINE DISEASE QUARTERLY

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COMMENTARY

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In an era of globalization of trade and expansion in the volume of international movement of horses for the purpose of competing in performance events or for breeding, the need for reporting disease events by countries worldwide has never been more important. The continued growth and success of the equine industry is critically dependent on the timely sharing of information on disease occurrences, if horses are to move internationally with minimal impediment. Movement can only take place in an environment in which the risk of disease transfer, inherent in trade between countries, can be mitigated to an acceptable and safe level.

Disease transfer can take place either from an imported equid to the resident population in the importing country, or vice versa, where an imported horse is infected following entry into a country. Critical to mitigation of disease transfer in either instance, is the availability of information on the disease status of the exporting and importing countries. In turn, mitigation is dependent on each country assuming responsibility for reporting occurrence of equine diseases listed by the World Organisation for Animal Health or Office International des Epizooties (OIE), to that organization. It is in a country's best interest from an international trade viewpoint, to notify the OIE of occurrences of listed diseases in a timely, transparent, and detailed manner.

Moreover, there are equine diseases additional to those listed by the OIE that warrant international reporting because of their animal health significance and potential economic impact. Two entities, the International Collating Centre (ICC), Newmarket, United Kingdom, and Réseau d'Épidémiologie Surveillance en Pathologie Equine (RESPE) in France currently post alerts on the

internet of confirmed occurrences of OIE listed as well as other equine diseases as they are reported from different sources.

An increasing number of countries besides the UK and France have developed national equine surveillance and reporting programs such as the Equine Disease Communication Center (EDCC) in the USA, that serve as reference sources of reliable information, reporting disease events for their respective equine industries in a timely manner.

Notwithstanding the widely acknowledged importance of international reporting of equine disease events, regrettably only a small number of countries do so on a regular basis as evident from the quarterly summaries reported elsewhere in this publication. All countries need to be encouraged to participate in the sharing of disease events via current channels of communication such as the OIE (official) and the ICC or RESPE (unofficial). Timely reporting and dissemination of such information is crucial to contain disease outbreaks and minimize the risk of international spread of diseases. Furthermore, addressing deficiencies in the known global distribution of various equine diseases will require more widespread participation by countries; this is critical if the health of equine populations worldwide is to be safe-guarded in the longer term.

Not to be overlooked in any consideration of the need for access to information on the occurrence of equine diseases at a national and international level, is the importance of periodic surveillance of a country's resident equine population for a particular disease or range of diseases. Surveillance provides a snapshot of the disease status of a country's equine population at a point in time.

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INTERNATIONAL

Fourth Quarter 2020

The International Thoroughbred Breeders Federation, International Collating Centre, Newmarket, United Kingdom, and other sources reported the following equine disease events.

The Republic of South Africa (RSA) reported that African horse sickness was endemic except for the controlled area in the Western Cape Province. A limited number of cases were recorded in Gauteng and Mpumalanga provinces.

Canada, France, Germany, the Netherlands, UK, and the USA confirmed outbreaks of equine influenza. The number ranged from two (Canada and the Netherlands), three (France, Germany and the UK), to at least 16 in the USA, where the disease is endemic. One outbreak in California involving 40 burros had a very high case-fatality rate.

Strangles is considered endemic in many countries with outbreaks confirmed by Belgium (one), Canada (one), France (five), Germany (eight cases), the Netherlands, and the USA (13 apiece). The majority of outbreaks were comprised of a single case.

Equine herpesvirus 1 (EHV-1) related diseases are endemic in most countries. Outbreaks of EHV-1 abortion were diagnosed in France and Germany (three each), Japan (five outbreaks involving seven Thoroughbreds of which six were vaccinated), the Netherlands (two), the UK (one), and the USA (four). EHV-1 neurologic disease was reported by the Netherlands (single case) and the USA (seven outbreaks in California, Florida, Michigan, and Oregon). California had three outbreaks involving 11 cases, and single cases were recorded in the remaining states.

Outbreaks of equine herpesvirus 4 (EHV-4) respiratory disease was reported by Belgium (two), France (14, all but three were single cases), Germany (one), the Netherlands (three, one involving four foals), and the USA (numerous states, mostly in foals).

Germany and the USA recorded cases of equine herpesvirus 2 and/or 5 infection. Infections were associated with respiratory disease in both countries and one case of EHV-2 associated keratitis in Germany. Equine infectious anemia was confirmed in Romania (one outbreak, two cases) and the USA (six outbreaks, five involving single cases and one, two cases), all in Texas.

The RSA recorded that equine piroplasmiasis was endemic, occurring sporadically in eight

provinces. Highest numbers were diagnosed in Gauteng and Western Cape provinces.

Germany reported a case of equine arteritis virus infection in a Warmblood stallion and *Taylorella equigenitalis* carrier state in three Icelandic stallions. Several cases of nocardioform placentitis and abortion due to *Amycolatopsis* spp. or *Crossiella equi* were confirmed by the USA.

France, Switzerland, and the USA recorded cases of leptospirosis. France (a case) and the USA (two cases) diagnosed cases of abortion. France also confirmed two outbreaks (single cases) of uveitis. Switzerland recorded a case of leptospirurea.

The USA recorded one case of *Neorickettsia risticii* abortion and three other outbreaks in which horses presented with fever, anorexia, depression, and diarrhea.

Salmonellosis was reported by the USA (three cases, two involving serogroup C1 and one of undetermined serogroup). Rotaviral diarrhea was reported by Argentina (one outbreak involving 40 vaccinated 20-40 day-old foals) and the USA (one case).

Clostridial enterocolitis was reported by the USA; nine cases were associated with *Clostridium perfringens* and two with *Clostridiodes difficile*. The USA confirmed 13 cases of proliferative enteropathy caused by *Lawsonia intracellularis*.

Canada (two outbreaks) and the USA (22 outbreaks) confirmed cases of Eastern equine encephalomyelitis (EEE), all were single cases. A case of dual infection with EEE and West Nile viruses was diagnosed in a vaccinated horse in Florida.

Outbreaks of West Nile virus infection were reported by Austria, France, and Italy (two outbreaks each, all single cases), Germany (four outbreaks), Spain (11 outbreaks) and the USA (16 outbreaks, all single cases).

Two outbreaks of vesicular stomatitis, Indiana serotype, were confirmed by the USA in Texas and Missouri.

Rhodococcus equi related diseases were reported by Germany (two cases of bronchopneumonia in foals), and the USA in which the disease is endemic and widespread.

Canada (one case) and the USA (11 outbreaks in Washington State) recorded occurrences of Pigeon fever, *Corynebacterium pseudotuberculosis* infection. Japan recorded one case of tetanus.



Equine Disease Quarterly

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Short- and Long-term Effects of COVID-19 Restrictions on Equine Markets

COVID-19 pandemic-related restrictions produced a recession, which economists typically define as two consecutive quarters of decline in GDP (gross domestic product) growth. Like every other business sector across the globe, the equine industry has been affected by COVID-19 related restrictions. We are now only starting to be able to assess short-term impacts, and it will be some time before the long-term impacts are fully understood. While we can look to recoveries from past recessions for insight, the contraction initiated by COVID-19 shutdowns is far different from earlier recessions, rendering historical information less predictive of the recovery path.

Across the globe, restrictions faced by equine industry participants have varied. Some governments mandated the closure of equine facilities to reduce the spread of the virus and minimize risks of injury, while others delegated responsibility to equine enterprise owners and managers. The complete closure of equine facilities has been especially damaging, as these operations bear significant ongoing expenses with no source of revenue.

Staggering early unemployment rates precipitated concerns of an impending equine welfare crisis. However, while some horse owners have certainly struggled to make ends meet due to unexpected job loss, much of this unemployment was temporary, and a large-scale crisis appears to have been avoided. Moreover, some organizations specializing in re-homing horses actually reported an increase in adoptions during the initial shutdown.

A handful of preliminary studies are underway across the U.S. to assess short-term COVID-19 related impacts. One such study is focused on breeding, boarding/training/lesson, and competition enterprises in Kentucky across all breeds and disciplines. Preliminary results suggest that while

not escaping the effects entirely, it appears that breeding and boarding/training/lesson operations were minimally impacted. However, enterprises related to competition, both racing and non-racing, appear to have sustained much greater financial hardship. In addition to direct job loss, the widespread cancellation of local, national, and international competitions has had a ripple effect on regional economies. Events able to operate shouldered increased costs associated with following health guidelines and were required to function with limited or no spectators, which are often a source of revenue.

Some consider commercial sales and breeding activity a bellwether for the health of the industry. In North American Thoroughbred auction markets in 2020, average prices for weanlings were down 6.2%, yearlings were down 20.3%, two-year-olds in training were down 26.7%, and broodmares were down 1.7%. Stud fees for North American sires standing for \$2,500 or more were down 3.7% overall. While contractions are never welcome, the decline was less drastic than some were anticipating.

The long-term impacts of COVID-19 restrictions will ultimately depend on the shape of the general market's recovery. While GDP growth responded quickly when the economy reopened, the recovery has not been uniform across sectors. Some parts of the economy, most notably service and tourism-related industries, continue to struggle. Any business cycle that affects disposable income will ultimately affect the equine industry as well, since it is centered on what economists consider a "luxury" good.

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NATIONAL

Equine Fungal Keratitis

Fungal keratitis is an infection of the clear outer surface of the eye (the cornea) caused by a fungus; the most common culprits are *Aspergillus* sp. and *Fusarium* sp. If not treated quickly and aggressively, fungal keratitis can lead to loss of vision or even loss of the eye itself. The incidence of

fungal keratitis in horses is much higher than in other domestic species. It is suspected that this occurs because horses have fungi living normally on the surface of the eye and the environment horses live in exposes them to fungi on a more frequent basis. Without a pre-existing wound or ulcer, the

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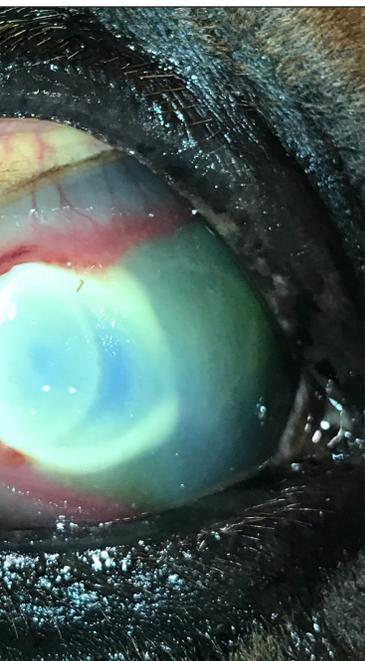


Figure 1. Fungal ulcer characterized by



Figure 2. Corneal abscess characterized by appearance. Often these abscesses are

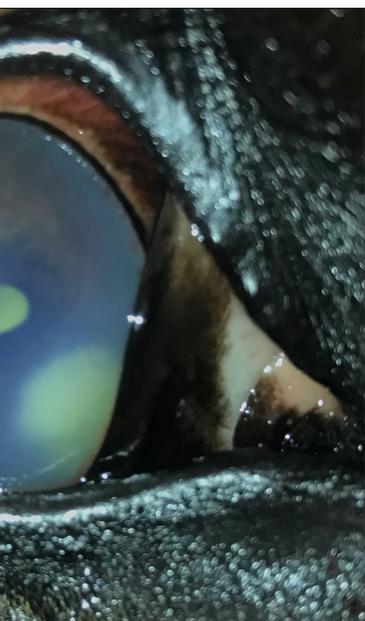
4 presence of fungi is not normally a problem for the horse. However, when a corneal ulcer is present, organisms normally on the anterior surface of the eye can result in an infection. Infection of the cornea can be devastating due to the often aggressive nature of fungi. Fungi release collagenolytics that break down the cornea and antiangiogenic factors that stop the growth of healing blood vessels into the cornea.



by a yellow, irregular area.

Fungal keratitis can result in two types of lesions, an ulcer or abscess. A fungal ulcer is usually whitish-yellow and irregular in shape; it is often surrounded by a groove (Figure 1). A stromal abscess generally starts as a corneal ulcer whose superficial layer heals and essentially traps the fungus within the cornea making it more difficult to treat. Affected eyes present with a smooth, yellow haze (Figure 2).

Initial treatment for a corneal ulcer usually consists of a topical antibacterial medication to prevent more commonly encountered bacterial infections. A simple corneal ulcer should heal within 5-7 days. If it does not, it becomes a complicated ulcer. Geographic location of a horse alone may influence a veterinarian's concern about a fungal infection. In the United States, it has been shown that Mid-Atlantic and Southeastern states have a high prevalence of keratitis, whereas the problem is much less common in the western states. There are many reasons for the development of a complicated ulcer. One of the tests a veterinarian can do to determine why an ulcer is not healing



ted by the smooth, yellow
re caused by a fungal infection.

is a corneal scraping for cytology. If the ulcer is infected, a specific inflammatory cell called a neutrophil, is present. In some cases, cytology can also help determine if the infection is bacterial or fungal. If fungal keratitis is suspected, an antifungal agent should be included in the treatment plan. The choice of an antifungal agent is based on the antimicrobial sensitivity of fungi in the area and level of the veterinarian's suspicion of the presence of a fungal infection. Many general practitioners will not have a topical antifungal agent on their truck. In such instances, silver sulfadiazine (a common wound cream) or miconazole (typically available at your local pharmacy) can be used until a more appropriate antifungal medication can be ordered. In the case of any ocular infection, it is highly important that whatever medication(s) are used, are approved for application to the eye. Where treatment proves difficult, placement of a subpalpebral lavage catheter can be considered to facilitate successful treatment. In cases of severe fungal disease, referral to an ophthalmologist should be discussed with the client to determine if surgical intervention is required. Even in severe cases, surgical intervention can be successful in preserving vision.

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KENTUCKY

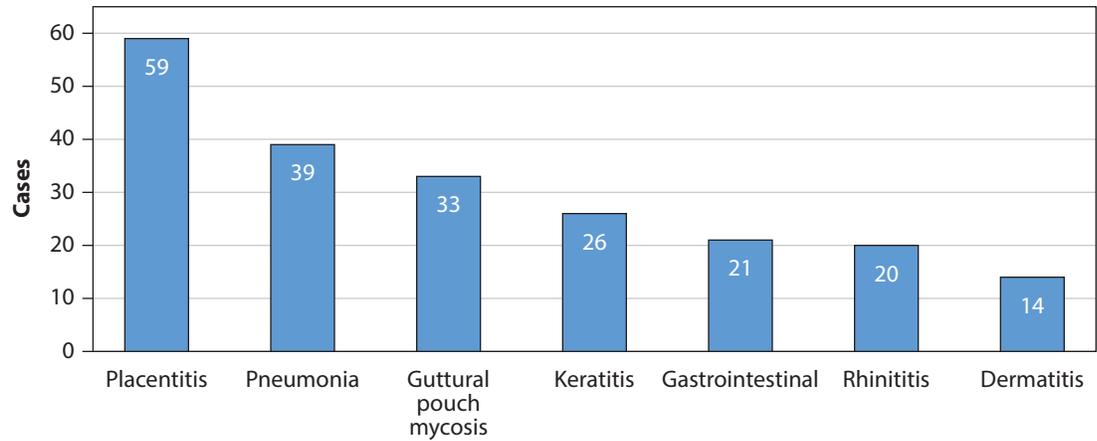
Equine Fungal infections in Central Kentucky (2009-2019)

Fungal infections in horses are considerably less common than infections caused by bacterial or viral agents. Fungal organisms are typically encountered in the animal's normal environment, and the clinical manifestation of disease often reflects the route of exposure (skin, respiratory tract or reproductive tract). In some cases, immunodeficiency or immunosuppression may predispose an individual to fungal infection, while in other cases, there is no identifiable predisposing risk factor. Overt signs of disease will typically be associated with an inflammatory response at the site of infection and may lead to generalized illness, abortion, or death.

A search of submissions to the University of Kentucky Veterinary Diagnostic Laboratory for the

period from 2009-2019 turned up 241 cases that had fungal involvement. The most common sites of infection were the placenta, lungs, eye, guttural pouch, skin, and nose. Less commonly represented were the gastrointestinal tract, nervous system, and multiorgan infections.

Fifty-nine cases of fungal placentitis were identified. Gestational ages ranged from 180 to 351 days, and the majority of cases presented as abortions four to one month prior to the mare's due date. The immediate/short term outcome for the foal was reported in 53 cases, of which 30 were born dead or euthanized. Live foals were frequently born early with gestational ages ranging from 310 days to full term. Five foals were born following premature placental separation, and three had a



Equine fungal infections in Central Kentucky, 2009-2019.

complicated delivery due to dystocia. A fungal organism was cultured in 18 cases, *Candida* sp. was isolated in two cases, *Rhodotorula* sp. in one case, and *Aspergillus* sp. in 15 cases. Age of the broodmare was generally not reported.

Thirty-nine cases of pneumonia were identified in horses ranging from three days to 25 years of age. Horses with fungal pneumonia often had a history of concurrent gastrointestinal disease (21/39 cases). Gastrointestinal diseases included prior surgery for large colon volvulus, colitis, and enteritis. Concurrent infectious agents identified in the gastrointestinal tract included *Lawsonia intracellularis* (one case), *Neorickettsia risticii* (one case), *Clostridioides difficile* (one case) and *Salmonella* sp. (five cases). The association between colitis, particularly due to salmonellosis, and pneumonia has been previously reported. Horses with fungal pneumonia but without a history of gastrointestinal disease presented with a range of conditions including nerve paralysis, immune mediated hemolytic anemia and dystocia. Treatment protocols were not provided often enough to determine how many horses received corticosteroids as part of clinical management.

Cases of guttural pouch infection ranged from two weeks to 23 years of age. Of 33 cases, 23 did not have co-morbidities outside of the guttural pouch. Where present, additional diseases included encephalitis, laminitis, uveitis, pneumonia and colitis, neuropathy, equine multinodular pulmonary fibrosis, basioccipital bone fracture, and small intestinal volvulus.

Twenty-six horses presented with fungal keratitis with an age range of 1-24 years. These were submitted as biopsy cases with minimal clinical histories and culture performed at external laboratories.

Twenty cases of gastrointestinal fungal infection were identified. Affected animals ranged from three days to 30 years of age and included four cases of fungal colitis, two of enteritis, nine of gastritis, one of enterocolitis, three of glossitis, and one of esophagitis. All but two cases had a more significant primary disease that included acute respiratory distress syndrome, sepsis, Tyzzer's disease, or diaphragmatic rupture.

Cases of rhinitis (14 cases) and dermatitis (21 cases) were submitted through the biopsy service, and sufficient clinical histories weren't routinely provided for analysis.

In summary, fungal infections, localized and systemic, continue to be an uncommon but important cause of disease in equids. It appears that primary infections of the dermis, nasal cavity, and guttural pouch frequently do not present with co-morbidities while those of the gastrointestinal and lower respiratory tract often occur with serious disease of other organ systems. Fungal placentitis continues to be a recognized cause of abortion and premature birth. In many cases culture is unrewarding and diagnosis is dependent on demonstration of the organism microscopically.

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COMMENTARY: *continued from the front page*

This is exemplified by two such studies cited in this publication. One involves two extensive surveys by the Korean Animal and Plant Quarantine Agency and the Korean Racing Authority and the other a survey by the Japan Racing Association and Japanese horseracing industry.

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ADDENDA

Korea: The Korean Animal and Plant Quarantine Agency and Korean Racing Authority carried out a serological survey in 2020 to investigate the presence of the following diseases in 1,323 Thoroughbred stallions, broodmares, racing horses, and ponies and riding horses raised in the country: African horse sickness, vesicular stomatitis, equine infectious anemia, equine viral arteritis, Japanese encephalitis, West Nile Fever, and equine influenza. All samples tested negative for these diseases.

A qPCR survey of 2,232 samples from Thoroughbred stallions and mares for contagious equine metritis identified one positive horse that has not been in service and has since undergone treatment.

Japan: In 2020, the Japan Racing Association and Japanese horseracing industry carried out a survey for evidence of equine infectious anemia in a total of 899 horses from 15 training centres or racecourses in Japan. All results were negative.

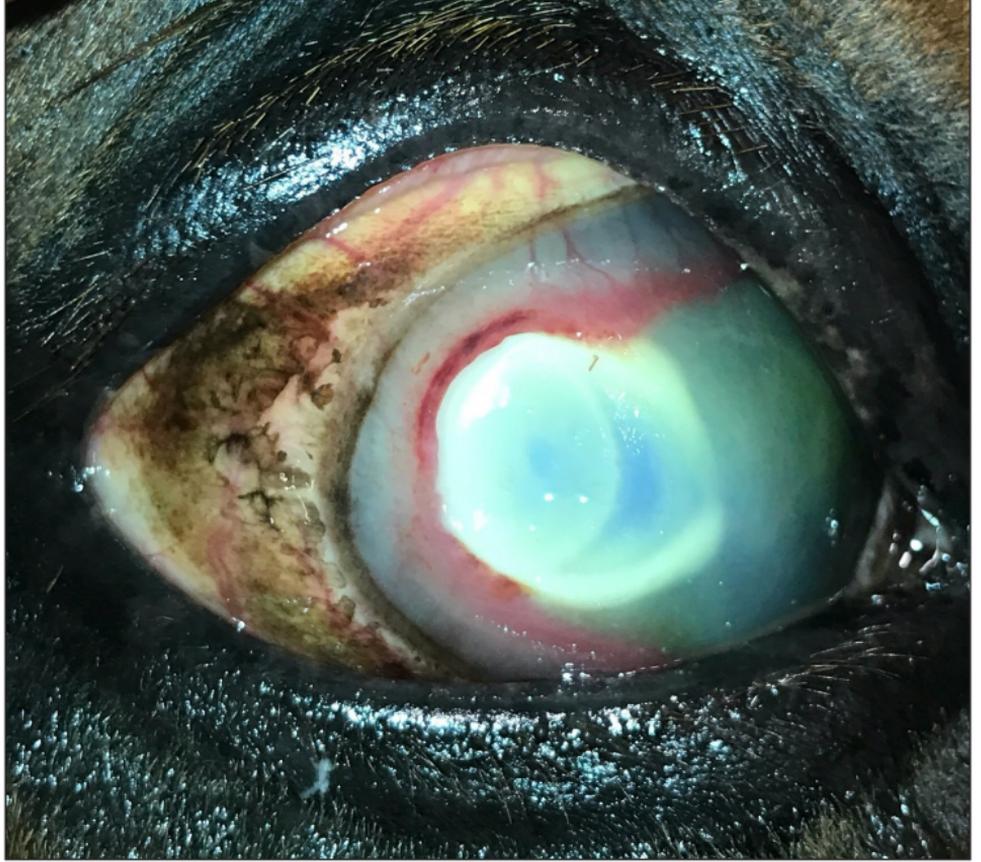


Figure 1. Fungal ulcer characterized by a yellow, irregular area.



Figure 2. Corneal abscess characterized by the smooth, yellow appearance. Often these abscesses are caused by a fungal infection.