

# Foreign and Emerging Animal Disease Awareness



## Looking for zebras among the hoof beats

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Unfortunately, the clinical signs we would expect to see associated with most foreign and emerging animal diseases (FADs) are not so pathognomonic (specific to the disease) that they would alert us of their presence with red flags, flashing lights and warning buzzers. Aside from *Foot and Mouth Disease*, for which we continually warn of the significance of vesicular lesions, most FADs are likely to present with signs that are either quite similar to domestic diseases that we may commonly see or may be so subtle as to be almost nonexistent. So adhering to the old adage, *'When you hear hoof beats, think horses not zebras'* might lead us to stray from suspicion of FADs when we should be.

As examples, take the two more recent incursions of foreign animal diseases in our equine population, *Contagious Equine Metritis* (CEM) and *Equine Piroplasmosis* (EP). Both of these equine diseases had been spreading undetected and undiagnosed in our equine population for many years. In the case of CEM, there was no suspicion related to any clinical signs in the form of infertility and metritis that led to the diagnosis and discovery of the disease. It was only coincidentally through testing animals to qualify for export purposes that it was discovered quite by accident. In the case of Equine Piroplasmosis, it was eventually a clinical case that led to the discovery of the *Theileria Equi* outbreak in a Texas ranch, but it was only through movement and surveillance testing initiated between states that other cases of both *Babesia Caballi* and *Theileria Equi* were discovered unrelated to the Texas outbreak. In total, there have been about 542 horses found positive for Equine Piroplasmosis in 16 states. No doubt, there were probably instances of clinical disease associated with some of these EP infected animals either in the form of acute fever, anemia and jaundice, or in the form of inappetence, malaise, chronic weight loss and poor exercise tolerance. Subsequent tracing and epidemiologic investigation of these outbreaks revealed the extent of the spread of these diseases that had been going on for many years undiagnosed.

So, how can and should front line veterinary practitioners and industry members remain vigilant for foreign animal diseases? The following is a list of suggestions for when to be suspicious or at least thinking about the possibility of a foreign animal disease:

- Anything that remains **undiagnosed, unsolved or unknown** after the usual suspects have been ruled out, regardless of the syndrome. In other words, when you hear hoof beats and you've ruled out the horses, then it may be time to start thinking about the zebras.



- **High morbidity and/or high mortality.** Disease outbreaks characterized by large numbers of animals affected and/or high death losses should increase our suspicion of something exotic. With our animal populations being very susceptible and immunologically naive, they are especially prone to rapid spread affecting large numbers of animals and/or that would affect animals so severely that death losses can be numerous. Outbreaks that are sudden, widespread and dramatic usually don't have a problem getting our attention.

- **Vesicular lesions** are characteristic of that which we tend to fear the most, *Foot and Mouth Disease* (FMD). But vesicular lesions are by no means exclusive to FMD. *Swine Vesicular Disease* and *Vesicular Exanthema of Swine* are examples of other FADs that can be clinically indistinguishable from FMD. A number of domestic diseases including *Vesicular Stomatitis*, Bovine Herpes Mammillitis, Pseudocowpox, Bovine Papular Stomatitis, or mucosal diseases such as BVD or *Malignant Catarrhal Fever* can be easily confused with foreign vesicular diseases. It is important to also be aware of the more subtle vesicular signs that can occur in the more resistant species which can easily go undetected in species such as sheep and goats. In some cases, coronary band lesions and resulting lameness associated with vesicular diseases can be easily confused with common foot rot. Remember, when we see vesicular lesions in horses, we should be thinking Vesicular Stomatitis and not FMD.

- **Abortion:** We warn often enough of the appearance of vesicular lesions as a sign of *FMD*, but how many would consider abortion and high mortality among neonates and younger animals as a prominent feature of FMD infection related to myocarditis. This can occur without the obvious appearance vesicular lesions, especially in more resistant species such as sheep and goats. Abortion can also be a prominent feature of *Rift Valley Fever*, an arthropod borne viral disease affecting ruminants that is also an important zoonotic disease. And don't forget about *Brucellosis* as an important cause of abortion which has almost been eradicated from the U.S.



- **Central Nervous System signs:** The emergence of new Transmissible Spongiform Encephalopathies such as *BSE* (Mad Cow Disease) and *Chronic Wasting Disease* in deer and elk brought new awareness to the significance of CNS signs in ruminant species that needed to be differentiated from some of the domestic rule-outs such as rabies, listeriosis, toxicities and certain common metabolic disorders. *Heartwater* is another tick-borne rickettsial disease that can present with CNS signs in ruminants. Among equine, the Arboviruses are an important rule out associated with CNS signs. Examples would include *Venezuelan Equine Encephalitis* (VEE) which would need to be differentiated from *EEE*, *WEE* and *West Nile Virus*. Among avian species and poultry, *Exotic Newcastle Disease* is of primary concern. In swine, the *Nipah Virus* can be associated with encephalitis.



- **Hemorrhagic diseases:** Many FADs that are systemic in nature will present with widespread hemorrhagic lesions and pathology. In swine, *African Swine Fever* and *Classical Swine Fever* or *Hog Cholera* come to mind and can be confused with many domestic diseases, PRRS, salmonella, and Erysipelas for example. In ruminants, *Rift Valley Fever*, and in avian species and poultry, *High Path Avian Influenza* and *Exotic Newcastle Disease*.



- **Respiratory Signs:** Primary respiratory signs can be a common feature among many foreign and domestic animal diseases. Respiratory disease in vaccinated animals that is unresponsive to treatment and for which an etiologic agent has not been identified should get us to consider FADs. Diseases like *Contagious Bovine Pleuropneumonia* will have significant primary lung involvement and pathology in cattle. Among avian species, the most obvious suspects again would be *High Path Avian Influenza* and *Exotic Newcastle Disease*. The Hendra viruses can cause a primary respiratory syndrome and pneumonia that is associated with the *Morbillivirus* in equine and the Nipah Virus in swine. These are also important zoonotic diseases for humans. *African Horse Sickness* is another vector borne viral disease which can present with primary respiratory involvement in equine.



- **Dermatoses:** We may not often think of skin conditions as an important sign of possible foreign animal diseases. Among this list are *Lumpy Skin Disease* in cattle; *Sheep and Goat Pox*; and *Screw Worm* myiasis. Certain forms of Psoroptic mange or *Sheep Scab* are also considered foreign to the U.S.

- **History associated with...**

- **Imported animals or animal products,**

The introduction of FADs is often associated with imported animals or products. There is good reason to believe that the recent outbreaks of *CEM* and *EP* in the U.S. at one time originated from imported animals. The first diagnosed case of *BSE* in the US was discovered in an animal imported from Canada. The zoonotic disease *Monkey Pox* is believed to have originated from imported rodents from Ghana. The introduction of *Exotic Newcastle Disease* has been associated with smuggled birds.



- **Foreign travel and visitors**

Occasionally, screw worm larvae have been discovered on small animals, and even humans, returning from travel overseas. Contact with livestock or farms overseas can potentially contaminate footwear, clothing and equipment with infectious disease agents. Another possibility is the intentional or malicious introduction of a foreign animal disease as a criminal act or as an act of bioterrorism.



- **Garbage feeding**



The transmission of many Foreign Animal Diseases has been attributed to the practice of feeding garbage to swine. Today's regulation of garbage feeding in swine was a key element in the eradication of Hog Cholera from the US. The 2002 outbreak of FMD in the UK has been attributed to the illegal feeding of garbage to swine.

- **Zoonotic disease, public health or human illness**



It has been estimated that approximately 75% of new emerging human infectious diseases have been zoonotic. Examples of important zoonotic FADs include...

- Hendra viruses, Nipah in Swine or Morbilliviruses in equine
- Arboviruses, VEE, EEE, WEE and WNV in equine
- H5N1 High Path Avian influenza
- Monkey pox
- Rift Valley Fever...

- **Wildlife Disease**



One of the biggest threats from the increasing populations of feral swine is the diseases they can carry. It was in feral swine along the border with Turkey that FMD was first discovered recently in Bulgaria. High Path H5N1 Avian Influenza or Newcastle Disease Virus can circulate in wild migratory birds. The emergence of West Nile Virus was first noticed in dead crows and zoological specimens before it was recognized in horses and humans. Cervid (deer and elk) populations will be susceptible to many of the same diseases as other ruminant species.

- **Insect Vectors**



Many FADs have insect vectors as an important mode of transmission. Where diseases are associated with the presence of active insect vectors, such as ticks, mosquitoes and biting flies, consideration should be given to the possibility of a foreign or exotic disease. The emergence of West Nile Virus and Equine Piroplasmiasis are two more recent examples.



- Arboviruses VEE, WEE, EEE, WNV – mosquitoes
- Piroplasmiasis/Babesiosis - ticks
- African Horse Sickness – mosquitoes and midges
- African swine fever - ticks
- Heartwater - ticks
- Rift Valley Fever – mosquitoes and flies
- Screw worm larvae



**Contacts for reporting animal diseases:**  
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