

# **FOOT AND MOUTH DISEASE: ARE LLAMAS AND ALPACAS AT RISK?**

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Based on the inquiries I have gotten over the past few weeks, I feel it would be timely to mention a few words about the current scare in Europe with Foot and Mouth Disease (FMD). As many of you know, I have been preaching biosecurity as an issue for the future for the industry. You have only to talk to the llama and alpaca owners in the United Kingdom to see how this can affect you whether you like it or not!

**What is it?** FMD is a viral infection of cloven-footed animals (virus is family icronaviridae, genus Aphthovirus, 7 serotypes: A, O, C, SAT1, SAT2, SAT3, ASIA1, and at least 60 subtypes - a very adaptable virus!). It most seriously affects cattle but swine, sheep, and goats can be severely affected at times. The virus does not appear to infect horses or people but there is a concern that any animal may act to spread the infection. The extremely difficult because little cross-protection exists between serotypes. This is one reason why slaughter, where practical, has been used to control and eradicate the disease. People do not appear to be susceptible to the disease unless severely immunocompromised.

**Where is it?** FMD is enzootic to Africa, Europe, Asia, Japan, Philippines, and South America. The spread of FMD is a critical concern to countries that do not have it (e.g. North America, Australia, and New Zealand). A good example of why FMD vigilance is critical: FMD was introduced to Canada in the baggage of a European immigrant. Britain suffered a massive outbreak in 1967-68 possibly as a result of feeding infected Argentine lamb to swine. That outbreak was controlled and the disease eradicated as was a smaller outbreak in 1980. The British survived that outbreak, you can be sure they will survive this one! The last reported case in the USA was in 1929. Australia and New Zealand have never had a case of FMD. FMD was eradicated from Mexico in 1954. Thus, all of North America is currently free of FMD. Apparently the Darien Gap (between Columbia and Panama) prevented northern spread of diseased cattle from South America.

**What does it do?** FMD is most severe in cattle and causes fever and vesicles in the mouth and on the feet. These cause lameness and decreased feed intake because of pain. The virus takes from 1 to 7 days from the time of infection to the development of clinical signs. At this time, high fever (104-106 F), low milk production, poor appetite, and depression are noted. Excessive salivation is present and vesicles (fluid filled pockets) are noted on the buccal mucosa, dental pad, and tongue. The vesicles rupture within 24 hours leaving a painful lesion. Vesicles also occur around the coronary band causing lameness. As vesicles heal, animals return to eating over

several days, but may take up to 6 months to fully recover. Occasionally, the heart muscle is damaged and acute deaths ensue. Diarrhea, sometimes including blood may be seen. In sheep, goats and swine, the disease is usually much less severe.

**How deadly is it?** FMD rapidly spreads within a herd and essentially 100% of susceptible animals succumb to the disease. FMD is not considered a particularly lethal disease. Death rates rarely exceed 2% in adults and 20 % in young stock. There have been outbreaks with up to 50% mortality. However, prolonged convalescence causes severe losses in production and health, cripples animal industries, and severely inhibits travel and tourism.

**Where does it come from?** There are a variety of species that allow the virus to persist or serve to spread the infection. Some include elephants, capybara, hedgehogs, coypu, rodents, birds, and wild ruminants (Roe deer, muntjac, sika deer, fallow and red deer, water buffalo). These animals may not show clinical signs, but may harbor the virus to allow later spread of the infection to susceptible species. These species are not likely to play a major role in transmission because of lack of contact with susceptible species. Sheep may carry the virus for up to 5 months. African buffalo may harbor the virus for up to 28 months! Goats may also serve as carriers of the disease. One study in Kenya showed that goats served a minor role in transmission to cattle and that sheep were not significant carriers. In other outbreaks, sheep meat imported from infected areas appear to have been the origin of infection.

**How is it spread?** The virus may be spread by inhalation or ingestion. Initial outbreaks are most commonly caused by ingestion (e.g. infected meat), but rapid spread within a herd is likely via inhalation (airborne virus). Wind and humidity appear to increase windborne spread. Virus spread has been estimated to be as far as 62 miles (100 kilometers)! Up to 50 % of infected animals may remain as carriers of the disease for at least 6 months. Virus could be recovered from nasal secretion of PEOPLE for up to 28 hours after working with infected cattle. In England, one estimate of how the disease was spread included birds (16%), meat products in pig food (40%), meat and bones (7%), unknown (7%), and obscure (28%).

**Can we kill the virus?** FMD is a very stable virus. It can survive up to 1 year in the environment, 10 to 12 weeks on clothing and feed, and 30 days on hair! Sunlight, boiling, and autoclaving rapidly destroy the virus. Most disinfectants and meat packing industry techniques do not destroy the virus. If you travel in an area that has FMD, you should use disposable shoes and clothing (e.g. coveralls), shower extensively after the visit and before traveling, and preferably stay away from any farm for at least 30 days. The best bet is to stay clear of infected areas during active outbreaks of disease.

**Do animals become immune?** Cattle mount an effective immune response to FMD that lasts up to 4 years. Swine immunity persists for only 7 to 8 months. Immunity is relatively specific to the serotype involved in the exposure. New outbreaks with different serotypes can occur at any time.

**How is it diagnosed?** There are multiple tests that have been used including tissue culture, virus neutralization, complement fixation tests, experimental infection, and ELISA tests. A government-approved laboratory must perform these. FMD is a federally reportable disease in the USA.

**Is there a vaccine?** Yes, but success of vaccination programs has been highly variable because of the multitude of serotypes and subtypes. The most common types are killed virus trivalent forms. Vaccination in the USA is not permitted. Suspected cases of FMD are required to be reported to federal authorities for investigation and immediate responses to control spread.

Are llamas and alpacas at risk? Unfortunately, the answer is both yes and no. Yes, llamas and alpacas have been infected with FMD. No they do not appear to be very susceptible to it. FMD infection in alpacas in Peru was confirmed in the 1970's. FMD risk in llamas and alpacas was researched carefully in Peru, the USA, and Argentina. Routes of infection included tongue scari-fication, intramuscular injection, intradermal injection, intravenous injection, and cohabitation. Llamas and alpacas appear to be very resistant of infection by natural exposure (cohabitation) but can and do succumb to infection when any of the other exposure methods were used. Infected llamas and alpacas developed high fever (104 F), were anorectic, had damage to the footpads, and became recumbent. Virus did not persist in any camelids beyond 14 days after infection. This is one of the diseases that make importation difficult with a lengthy quarantine period. Certainly, the risk of llamas or alpacas becoming infected seems extremely low.

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