

FOOT AND MOUTH DISEASE

One person's perspective

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A furor is taking place that is unprecedented in modern times. Foot and mouth disease is on the lips of all animal owners throughout the world. A day doesn't pass that there isn't mention of this disease in the newspaper or on television. Llama and alpaca owners are justifiably concerned. E-mail and internet communication have made it possible for the foment to become widespread. I offer the following in an attempt to smooth the troubled waters. There may be no answers for some questions. No one person can speak with absolute authority on every, "What if?" "Who will act?" "What can I do?" However, a few facts and figures may encourage us to look at the big picture rather the small window of our limited knowledge on the subject. I am a firm believer in looking at a problem from the what, why, where, when, who and how perspective.

Why am I writing about FMD? I don't own llamas or alpacas. I hold no office in any llama or alpaca organization, however, I have been a longtime supporter of the llama and alpaca industries. In the past I have served the industries in government relations with the U.S. Animal Health Association. As for FMD, I have lived and worked in countries where FMD is endemic. I have seen the effects of FMD on cattle industries in those countries. I have seen wild deer in which FMD was produced experimentally, while participating in a course about foreign animal diseases at Plum Island. I have reviewed over 60 professional papers that have been published on FMD in camelids. Finally, I am concerned about the panic that has been generated within the llama and alpaca industries.

WHAT IS THE PROBLEM?

Foot-and-mouth disease (FMD, aftosa, aphthous fever, hoof and mouth disease) is a highly contagious viral disease, primarily of cattle, sheep, swine, and goats, but also affecting cloven-hoofed wild animals (deer, elk, moose, wild sheep, mountain goats, wild pigs). Horses are not affected.

FMD is characterized by marked salivation, vesicular (blister) lesions and, subsequently, erosions and ulcers of the epithelium of the lips, gums, soft palate, nostrils, muzzle, coronary bands, between the toes and on the teats. Initially, animals may develop a fever. The lesions in the mouth may make eating painful, so animals refuse to eat, resulting in weight loss, declined milk and meat production. Foot lesion may cause the animal to be lame.

Seven immunologically distinct types of FMD virus (FMDV) are known. Within the seven types, over

60 subtypes have been identified over the years by special laboratory tests.

Of recent concern is the so-called Pan-Asian strain of the O-type virus, which seems to be highly pathogenic (causes disease) and is spreading rapidly throughout some parts of the world. However, it must be kept in mind that outbreaks of FMD in other countries may be caused by one of the other strains. The strain of virus has important implications for vaccination programs, as a vaccine developed for one strain may be ineffective for protection against another strain.

The present foot and mouth disease crisis in the United Kingdom, France and The Netherlands has caused reverberations in every nation of the world with a sizable cattle, sheep, goat and swine population.

Llamas and alpacas are highly resistant to FMD virus infection. Experimental research conducted at the Plum Island Research Center in New York and in Argentina concluded that llamas are resistant to the virus and that even when experimentally infected, the animals do not carry the virus for longer than 14 days. They are not considered to be potential carriers. Alpaca cohabitating with cattle during an FMD outbreak in Peru generally remained free of FMD, however, FMD virus has been isolated from at least one alpaca.

It would be incorrect to say that llamas and alpacas could not, under any circumstance, develop FMD during an outbreak in other livestock. Furthermore, no studies have been conducted in field situations on the Pan-Asian, type O-strain in camelids. While government officials understand that llamas and alpacas are highly resistant to FMD virus, no one can say with finality that infection couldn't happen.

Llama, alpaca and livestock owners are not the only people concerned. Zoos throughout the world exhibit and maintain many cloven-hoofed wild animals. In the past, outbreaks of FMD have devastated zoos in Italy, North Africa, France, Switzerland and South America.

WHY ARE LLAMA & ALPACA OWNERS CONCERNED?

1. They hear on television and read in the newspapers of thousands of animals being destroyed in Great Britain, France and The Netherlands.
2. E-mails are flying back and forth across the Atlantic with horror stories of camelids being killed along with cattle and sheep.
3. Well-meaning individuals are seeking legal intervention to prevent destruction (real and potential) of their animals.
4. Hopes of a cure-all vaccination program are being touted by journalists and even by companies that stand to profit from seeing a vaccine program inaugurated.
5. Compassion for animals

6. Potential loss of a livelihood
7. Humane considerations
8. Feeling that government agencies aren't handling the outbreaks properly
9. Fear that government authorities here in the United States know little or nothing about llamas and alpacas.
10. Many llama and alpaca owners in crisis countries have justifiable concern as to where their animals fit into governmental policies regarding movement of animals, quarantine, testing, slaughter, vaccination and possible indemnity.

WHERE DO PROBLEMS EXIST?

The first reports of the Pan-Asian strain of the O-type FMD virus came from India in 1990. It has subsequently spread to the Middle East, South East Asia, China, Taiwan, Korea, Japan, South Africa, Columbia, Kingdom of Saudi Arabia, United Kingdom, Republic of Ireland, France and The Netherlands. Various types of FMD are present endemically (appearing regularly) in approximately 2/3 of the countries of the world; 34 countries in the last 18 months. Many of these countries allow vaccination as a means of minimizing the effects of the disease. This raises the question, "Why doesn't the United States allow vaccination?" This will be discussed later. Countries that are currently free of FMD are Australia, New Zealand, Canada, Eastern Europe, Scandinavia, Mexico and the United States.

WHO SHOULD BE IN CHARGE?

Government agencies in countries that have been free of the disease in the immediate past are responsible for carrying out the dictates of legislative bodies relative to disease control. The governing authority for protecting the livestock interests of the United States is the United States Department of Agriculture (USDA); given that authority by Congress.

Present government policy in the United Kingdom, France, The Netherlands, Canada and the United States dictates that infected animals or susceptible animals exposed to infected animals be slaughtered to prevent the spread of the disease.

Place yourself in the shoes of USDA officials. They are given the responsibility of protecting the livestock interests of the country. Over 185 million head of livestock are potentially susceptible to FMD virus in the United States, see table 1. Think of the billions of dollars valuation of the livestock industries. Consider also that over 17 million wild animals are potentially susceptible to FMD. It is estimated that it would require 6 to 14 billion dollars to eradicate FMD should an outbreak occur here. The cost of living with FMD would be infinitely more devastating. USDA is not taking lightly the responsibility to protect the livestock industries of

this country. Neither are they disregarding the camelid industries. Wildlife authorities are working with USDA to prevent introduction into wild populations.

Table 1. Estimated Numbers of Animals in the United States

ANIMAL	ESTIMATED NUMBERS
Dairy cattle	17,168,000 ^a
Beef cattle	97,308,000 ^a
Sheep	7,825,000 ^a
Goats	1,400,000 ^a
Swine	61,158,000 ^a
Alpacas	29,732 (1)
Llamas	138,780*, Estimated 175,000
Guanacoes	394*
Vicuna	3*
Camels	4,000
White-tailed deer	12,450,000
Mule deer	2,250,000
Elk	1,000,000
Moose	1,000,000
Dall sheep	Up to 95,000
Bighorn sheep	35,000
Mountain goat	100,000
Wild pigs	?
Peccaries	?

*Registered with International Lama Registry, **Wool only,

(1)Alpaca Registry International,

^aFrom USDA website (usda.manlib.cornell.edu/reports/nassr/livestock/pct-bb)

Species that are highly susceptible to FMD virus include cattle, swine, sheep and goats. The wild species of cloven-hoofed wild animals are likely to be equally susceptible to FMD virus.

California experienced an outbreak of FMD in coastal black-tailed deer (a subspecies of mule deer) in 1924. Over 22,000 deer were killed to eradicate the disease. Ten percent of those killed had lesions of FMD. The introduction of FMD virus into the United States has serious implications for wildlife and to regulatory authorities, who must deal with these issues.

The USDA's Animal and Plant Health Inspection Service (APHIS) maintains emergency response teams

ready to go into the field and deal with any suspected vesicular disease as a potential FMD outbreak. If vesicular lesions are found in animals, the farm is quarantined until a diagnosis is made. Samples from any suspected vesicular disease are couriered to the Plum Island Animal Disease Center, at an island off Long Island, New York, for laboratory diagnosis. Some 400 to 600 such samples are evaluated each year.

Foot and mouth disease is not the only vesicular disease that must be considered in the United States. Swine may develop vesicular exanthema disease. Cattle, sheep, goats, swine, horses and llamas are also susceptible to a disease called vesicular stomatitis (VS), which appears periodically in various areas of the

United States. The clinical signs of VS are indistinguishable from those of FMD. The point is that government agencies are continually vigilant and have everything in place to prevent and deal with vesicular diseases.

HOW CAN INDIVIDUALS OR GROUPS BE MOST EFFECTIVE IN PROTECTING THEIR INTERESTS?

1. Work together as an industry or industries, rather than developing special interest groups fostering one aspect of the overall problem.
2. Ask governmental authorities how the industry may be of service to and support governmental policies.

WHAT SHOULDN'T BE DONE?

1. Panic!!!
2. Assume that every press release or media report is a true reflection of the actual situation
3. Circulate or re-circulate information that has not been verified by knowledgeable people.
4. Small groups trying to pressure government officials to cater to their interests
5. Assume that no one is looking out for the interests of llamas and alpacas in the United States

WHAT CAN BE DONE NOW TO PREVENT THE INTRODUCTION OF FMD INTO THE UNITED STATES?

1. Become knowledgeable about how the FMD virus is spread, which is primarily by droplets in the air (aerosol) coming from an infected animal. Experience in England has shown that wind is an important factor in spreading the virus. Direct contact from one animal to another is an important means of spread. The virus may become attached to feed, bedding and equipment used around infected animals which may also contaminate drinking water. The current outbreak in the United Kingdom was likely caused by smuggled-uncooked meat products from Asia that ended up in garbage fed to swine. While humans are not infected by the virus, they may be mechanical vectors via their hands, footwear or even by harboring the virus in the throat. Persons working with FMD infected cattle at Plum Island, are required to agree not to be near livestock for at least seven days. It has been shown that a person can shower out of a facility one day and return the next day to handle a group of non-infected cattle and transmit the virus to the new cattle from aerosol transmission from his or her throat
2. Try to educate fellow owners and breeders on FMD facts.
3. Educate visitors to your farm or ranch. As stated before, zoos have great concern about FMD. The American Zoo and Aquarium Association (AZA) has issued a set of guidelines to help protect member zoos. They suggest a two-pronged approach. First is public education by posting a statement such as the following in

prominent places at the entrance and within the zoo. “Attention Zoo Guests.....Please help protect our zoo animals from foot and mouth disease. If you have traveled outside of North America in the last 5 days, please check in at the guest services desk before visiting the animal exhibits. Thank you for your cooperation.” A similar notice may be used to alert visitors to your ranch. Attention visitors!!! Please help us protect our beautiful animals from contagious diseases. If you have traveled outside of North America in the past 5 days, please check with us before going near any of the animals.

Secondly, educate and instruct all persons who have direct care of your animals to pay close attention to any abnormal behavior or clinical sign of disease. Be specific about recognition of the signs of FMD as described above. Report any suspicious sign to your veterinarian.

3. Avoid travel to any area of the world where FMD is present
4. Discourage direct contact by visitors with your animals.

OWNER’S RESPONSIBILITY IN THE UNFORTUNATE EVENT THAT FMD virus ARRIVES IN NORTH AMERICA?

1. Do not bring any new animals onto your farm during the crisis.
2. Avoid transporting your animals anywhere
3. Make no visits to farms with cattle, sheep or swine.
4. Discourage visitation to your farm
5. Follow a policy of strict adherence to policies and procedures instituted by government officials
6. Avoid mixing llamas and alpacas with other livestock species.

HOW SHOULD LLAMA AND ALPACA OWNERS INTERACT WITH GOVERNMENT AGENCIES?

I feel strongly that owners and organizations should direct their efforts through channels that are already in place and functioning. Government relations at the national level have been in operation for many years. The llama and alpaca industries enjoy an excellent relationship with the United States Animal Health Association, USDA and state regulatory officials as a result of years of working **with** this organization for the best interests of all concerned. Dr. Tom Bunting forged the initial links, followed by Donald Christ and lately by Bob Frost. Bob Frost has represented the llama industry at USAHA for over 11 years. Few people are aware of the tremendous effort he has made to become acquainted with key people within government circles. He is known and respected within the USAHA because of his committee activities and he has become knowledgeable about specific diseases of concern to the llama industry. His efforts have gone beyond the llama industry, and he is known for his grasp of the concerns of the entire livestock industry in this country.

He has become a vice president within the USAHA and will ascend to the presidency in due time. He is now in a key position to foster the interests of the camelid communities to the highest level of government. He is in constant communication with the key players in the current world crisis on FMD.

Any activity dealing with the current crisis that ignores or tries to circumvent channels that have already been firmly established will be counter-productive. FMD is not the only disease of concern to the camelid industries. Perhaps now is an appropriate time for the many groups that comprise the camelid industries to remain calm and realize that government relations at the national level require a firm commitment and continued financial support to allow representatives to attend meetings and carry out the many duties imposed upon them.

Additional information is needed on a number of diseases so that the camelid industries may be proactive in diagnosis, rather than being apologetic or playing catch-up during crisis situations. We don't have sufficient information on FMD to make an airtight case for the exclusion of camelids from potential regulation. These activities require money to conduct the research necessary. That money must come from the industry.

WHY CAN'T WE VACCINATE OUR ANIMALS TO PROTECT THEM?

At the present time it is illegal to vaccinate any animal against FMD virus in North America. Vaccination in the United Kingdom and Western Europe has been seriously considered as a means of more rapid containment of FMD. If it had been instigated, once the spread had been halted, all vaccinated animals would have had to be destroyed, because it would not be possible to tell the difference between a naturally infected animal and a vaccinated animal. I am fully aware that at least one company says that it has a test that could tell the difference if the government would quickly authorize use of the test. That is self serving, and insufficient data exists to rely on such a test for a country's control of FMD.

The USDA, at Plum Island Research Center, is currently working feverishly to develop a suitable vaccine using new recombinant DNA technology. Currently, the USDA would have to rely on the production of vaccines from the Pirbright facility in England.

There are over 60 subtypes of the FMD virus. This means that the subtype must be identified in an outbreak and a type-specific vaccine would have to be used. Reports of vaccine failures in countries around the world may mean that the wrong subtype vaccine was used.

Vaccines are developed for a particular species of animal, and not approved for use until thousands of animals have been shown to be protected by the vaccination, which includes challenging those animals with the disease agent. As many llama and alpaca owners know, no vaccines have been approved for use in their

animals. Millions of dollars, and at least 2 year's time, would be required for the appropriate tests necessary to gain approval by USDA. Furthermore, the only laboratory where research on FMD could be conducted in the United States is at Plum Island, and their priorities are elsewhere at the moment.

Is vaccination in the offing for llamas and alpacas? **NO!!**

CONCLUSIONS

1. USDA is doing all within its power to prevent the introduction of FMD virus into the USA.
2. Llama and alpaca interests are represented to the highest level of the USDA.
3. The high resistance of llamas and alpacas to FMD virus is known and appreciated by regulatory authorities.
4. Nothing is to be gained by small groups trying to put pressure on government officials at the local, state or national level.
5. Regulatory agencies receive their authority from Congress, which may have the final word in the event of a crisis.

REFERENCES

A list of selected references on FMD in camelids may be obtained from the author.