

Foot and Mouth Disease in Uruguay

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FOOT-AND-MOUTH DISEASE IN URUGUAY

Introduction:

On October 26, 2000, Uruguay notified United States and the Office International des Epizooties (OIE) that foot-and-mouth disease (FMD) virus type O had been isolated from swine and cattle on a farm in the Department of Artigas [1, 2]. This Department (i.e., an administrative unit equivalent to a State) is located in the northern part of the country and borders Brazil. Prior to this, Uruguay had not had a case of FMD since 1989, and in 1997, Uruguay was recognized as free of FMD by the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) [3].

As a result of the outbreak, Uruguay suspended exports of beef to the United States and the US placed a hold on animal products imported from Uruguay. The principal animal commodity imported into the US from Uruguay is fresh (chilled or frozen) beef; no live ruminants or swine have been imported from Uruguay in recent years.

On November 20, 2000, Uruguay sent a team of veterinary officials to the US to provide detailed information on the outbreak history, measures taken to eradicate the disease, movement controls, monitoring and surveillance, and other relevant activities [4, 5]. Coincidentally, APHIS had conducted a site visit in Uruguay in September 2000, approximately 4 weeks before the outbreak. During that visit, the APHIS team obtained information on Uruguay's veterinary infrastructure, animal health programs, and ongoing activities related to FMD exclusion and surveillance [6].

Uruguay is listed as a region recognized as free of FMD and rinderpest in Title 9, Code of Federal Regulations [3]. APHIS considered two options in making the necessary regulatory changes in Uruguay's FMD status: (1) remove the entire country of Uruguay from the list of regions recognized as free of FMD; or (2) remove only a portion of Uruguay (e.g., one or more Departments) from the list of regions recognized as free of FMD. The latter option is consistent with APHIS's obligations under the Sanitary and Phytosanitary (SPS) Agreement of the World Trade Organization [7].

In assessing the FMD situation in Uruguay, APHIS evaluated the following factors based on information provided by officials of Uruguay [4, 5, 8-10].

- Authority, organization, and infrastructure of the veterinary services in the region
- Disease surveillance in the region
- Diagnostic laboratory capabilities
- Disease status of the region
- Active disease control program, if any, if the agent is known to exist in the region
- Vaccination status of the region

FOOT-AND-MOUTH DISEASE IN URUGUAY

- Disease status of adjacent regions
- Separation of the region from regions of higher risk through physical or other barriers
- Control of movements of animals and animal products from regions of higher risk
- Livestock demographics and marketing practices in the region
- Emergency response capability

A summary of the data relating to each of these factors is presented below.

Description of the Disease

FMD is a highly contagious disease affecting multiple species of animals. FMD causes significant economic losses and is one of the most important sanitary barriers to the international trade of animals and animal products. Susceptible animals include cattle, sheep, goats, swine, domestic buffaloes, and all wild ruminants and suidae. Camelidae (camels, dromedaries, llamas, vicunas) have a low susceptibility. The mortality rate is generally low in adult animals, but FMD virus often causes high mortality in young animals due to myocarditis. FMD is endemic in parts of Asia, Africa, the Middle East and South America.

The causative agent of FMD is a virus of the family Picornaviridae, genus Aphthovirus [11]. There are seven immunologically distinct serotypes of FMD virus: A, O, C, SAT1, SAT2, SAT3, and Asia1. Transmission is by direct or indirect contact. Vectors, both animate (e.g., humans) and inanimate (e.g., vehicles, implements), play a role in the transmission of FMD virus, and airborne spread of the virus can occur, especially in temperate zones.

Sources of the virus include incubating and clinically affected animals. The virus can be recovered from breath, saliva, feces, urine, milk, and semen (up to 4 days before clinical signs). Meat and animal by-products in which the pH has not fallen below 6.0 are also a source of FMD virus [12]. A carrier state may occur in convalescent animals and exposed vaccinates, particularly in cattle and water buffalo [11]. The virus persists in the oropharynx for up to 30 months in cattle or longer in buffalo, and up to 9 months in sheep. African Cape buffalo are the major maintenance host of SAT serotypes.

The incubation period of FMD is 2-14 days [11, 12]. In cattle, the initial clinical signs include pyrexia, anorexia, shivering, and a reduction in milk production. This is followed by the formation of vesicles (aphthae) on the buccal and nasal mucous membranes and/or between the claws and on the coronary band. Vesicles can also occur on the mammary glands. Smacking of the lips, grinding of the teeth, profuse drooling, lameness, and stamping or kicking of the feet are commonly associated with vesicle formation. After about 24 hours, the vesicles rupture leaving erosions of the affected membranes. Recovery generally occurs within 8-15 days, but complications include tongue erosions; secondary infection of lesions; hoof deformation; mastitis and permanent reduction in milk production; myocarditis; abortion; death of young animals; permanent loss of weight; and loss of heat control.

FOOT-AND-MOUTH DISEASE IN URUGUAY

Lesions are less pronounced in sheep and goats. Vesicles are common on the dental pad of sheep, but foot lesions may go unrecognized. Agalactia in milking sheep and goats is a feature, and FMD causes death of young animals. Pigs may develop vesicles on the snout and interdigital spaces. Severe foot lesions may occur when pigs are housed on concrete. High mortality in piglets is a frequent occurrence.

Evaluation of Risk Factors:

1. The authority, organization, and infrastructure of the veterinary services organization in the region.

The veterinary services of Uruguay are administered by the Department of Livestock Services within the Ministry of Livestock, Agriculture and Fisheries. There are four Divisions within the Department of Livestock Services, i.e., Animal Health, Veterinary Laboratories, Animal Industry (meat and poultry inspection), and Control of Herds and Livestock Movement. The Division of Animal Health has principal responsibility for disease control and eradication programs. The Division's field force is distributed among 44 veterinary offices in six regions. Each region encompasses 3 or more Departments (State-equivalents). There are a total of 19 Departments in Uruguay and these are subdivided into Districts (county-equivalents). The Division of Animal Health currently employs some 99 veterinarians, 291 animal health technicians, and 5 administrative personnel. To put these numbers in perspective, it should be noted that the country of Uruguay is approximately the same size as the State of Oregon.

Activities of the Division of Animal Health are augmented by a very sophisticated identification system that allows trace-back of animals to the herd of origin [8]. Animal identification is the responsibility of the Division of Control of Herds and Livestock Movement, which is staffed by 4 veterinarians, 25 animal health technicians, and 38 support personnel. No animal movements are allowed without a permit, and Federal police in over 240 posts countrywide enforce movement controls.

The Division of Animal Health receives full support from the Uruguay military in emergency situations.

2. The type and extent of disease surveillance in the region.

Reporting of all FMD-suspect cases is required by law, and significant awareness of FMD and its clinical signs exists in Uruguay. Prior to the outbreak, Uruguay increased surveillance activities because of events in Argentina and Brazil (see below). The APHIS team that visited Uruguay in September reported that over 8,700 serum samples had been tested for FMD antibody with negative results during the 15 days prior to their visit [6].

Following the outbreak and implementation of eradication measures, intensive active surveillance began in the zone surrounding the area under depopulation. During the

FOOT-AND-MOUTH DISEASE IN URUGUAY

period of October 25 through October 31, 135 farms were visited and 15,194 cattle, 59,140 sheep, and 896 pigs were subjected to clinical inspections and serologic testing. Active surveillance continues in the "peripheral zone," i.e., a zone of 25 km radius around the depopulated area. Latest data provided by Uruguay show that during the period of November 11 through November 15, 2,591 cattle and 1,310 sheep were inspected and sampled on 172 farms. Results of testing and inspection have been negative.

FMD surveillance has been intensified throughout the country. As mentioned elsewhere, no animal movements are allowed without a permit, and animals are inspected prior to movement.

3. Diagnostic laboratory capability.

The Division of Veterinary Laboratories maintains three regional diagnostic laboratories and the Central Veterinary Laboratory in Montevideo. FMD serology is conducted in the Central Veterinary Laboratory. Specimens collected for virus isolation and identification are sent to the Pan American Foot and Mouth Disease (Panaftosa) laboratory in Belem, Brazil.

4. Disease status - is the disease agent known to exist in the region?

The recent outbreak of FMD was confined to a single farm in one District of the Department of Artigas. No cases of FMD have been reported elsewhere in Uruguay since 1989.

5. The extent of an active disease control program, if any, if the agent is known to exist in the region.

In the event of an animal disease emergency, Uruguay implements vigorous stamping out measures. In the current emergency, clinical signs suggestive of FMD were first observed on October 23, 2000. All susceptible animals on the affected farm were slaughtered the following day, even though laboratory confirmation of FMD had not yet been obtained. A ban on animal movements was also established, and on October 25, the veterinary authorities began depopulating animals on adjacent farms. A positive diagnosis of FMD was obtained on October 26, and the virus was identified as type O by the Panaftosa reference laboratory in Brazil.

The affected farm was an establishment with fattening beef cattle, with three owners sharing the same field. Sheep and swine were also kept on the premises, and the pigs were apparently the first species affected. Although the source of the outbreak has not been confirmed, it is likely that the pigs consumed infected material illegally brought in from Brazil. Garbage feeding is prohibited by law in Uruguay. All susceptible animals (332 cattle, 63 sheep, and 40 pigs) on the outbreak farm were destroyed. Seven piglets had died prior to the commencement of eradication activities.

FOOT-AND-MOUTH DISEASE IN URUGUAY

An outbreak zone of at least 5 km radius was established around the infected farm, and all susceptible animals within this zone were depopulated. In addition, all susceptible animals in the suburban area of the City of Artigas, which lies outside the 5 km zone, were destroyed because they were considered high risk. In total, 6,908 cattle, 12,384 sheep, and 1,114 pigs were destroyed.

These stamping out measures were completed by November 2. Surveillance continues outside the depopulated area, but to date, no additional cases of FMD have been found.

6. The vaccination status of the region.

Uruguay has not vaccinated for FMD since 1994.

7. Disease status of adjacent regions.

External (International) Regions

Uruguay has international borders with Argentina and Brazil. Prior to August 2000, Argentina had not reported a case of FMD since 1994 and ceased vaccinating for the disease in April 1999. The country was recognized by OIE in May 2000 as an FMD free country where vaccination is not practiced. On August 2, 2000, Argentina reported the isolation of FMD virus type A24 from a bovine animal that had been illegally imported [13]. Serologic evidence of exposure to FMD virus was found in several other cattle. All illegally imported cattle and contact animals were depopulated, and no clinical cases of FMD were seen.

In September 2000, OIE sent a mission to Argentina to investigate the situation. Based on the findings of the mission, OIE continues to recognize Argentina as an FMD free country [13]. It should be noted that OIE's decisions regarding FMD freedom are not binding on member countries. The United States has not recognized Argentina as free of FMD.

Prior to August 2000, the Brazilian State of Rio Grande do Sul, which borders Uruguay along the northern and eastern frontier, had not reported a case of FMD since 1993, and was recognized by OIE as an FMD free zone where vaccination is practiced. On August 23, Brazil reported the isolation of FMD virus type O in a dairy herd [14]. The source of the outbreak has not been determined with certainty, but is probably associated with the illegal importation of animals. Brazil instituted a stamping out campaign, but additional outbreaks occurred. According to the most recent report (October 22, 2000) available on the OIE Web site, outbreaks have continued at least through September 22, and the total number of outbreaks (as of October 22) in the State of Rio Grande do Sul stands at 22.

FOOT-AND-MOUTH DISEASE IN URUGUAY

Internal (National) Regions

Uruguay is comprised of 19 Departments (State-equivalents) and these are subdivided into Districts (county-equivalents). The October 2000 outbreak of FMD in Uruguay was confined to a single farm in one District of the Department of Artigas. Artigas is divided into 10 Districts. The affected District lies on the border with Brazil and is separated by at least two Districts from Artigas' border with other Uruguayan Departments. All susceptible animals in the affected District were depopulated. The outbreak zone established around the infected farm had a radius of at least 5 km and extended into neighboring Districts. All susceptible animals within this zone were depopulated.

The Department of Artigas was the only region involved in the FMD outbreak. The outbreak appears to have been effectively controlled and probably eradicated at the time of this writing. No FMD has been reported elsewhere in Uruguay since 1989.

8. The degree to which the region is separated from regions of higher risk through physical or other barriers.

The Uruguay River separates Uruguay from Argentina. With the exception of rivers along parts of Uruguay's border with Brazil, there are no significant physical barriers separating Uruguay from Brazil. Likewise, the Department of Artigas is not separated from the rest of Uruguay by physical barriers. However, as noted below, animal movements from the Department of Artigas are effectively blocked by the Division of Animal Health and the Uruguay military.

9. The extent to which movement of animals and animal products is controlled from regions of higher risk, and the level of biosecurity regarding such movements.

International Movements

Uruguay prohibits the importation of susceptible animals and animal products from countries affected with FMD. All vehicles entering the country are routinely inspected. Confiscated materials, mostly plant products, are incinerated at the border posts. Vehicles must pass through a disinfection trough before traveling further into Uruguay.

International garbage is incinerated at the seaport or airport of arrival. Two new x-ray type machines have been installed in the Montevideo airport, and arriving baggage is checked for organic material.

Internal Movements

The Division of Animal Health and the Ministry of Defense have set up a series of movement control and blocking posts that effectively separate the outbreak area and the entire Department of Artigas from the rest of Uruguay. These posts are established at three levels, i.e., around the outbreak area, around the surveillance area, and along the

FOOT-AND-MOUTH DISEASE IN URUGUAY

border of the Department of Artigas. In their October 26 report to OIE [1], Uruguay provided a map showing the location of these posts.

10. Livestock demographics and marketing practices in the region.

Uruguay's cattle and sheep populations are approximately 10,400,000 and 13,000,000 head, respectively. Approximately 547,000 cattle and 1,500,000 sheep are located in the Department of Artigas. Pig and goat production nationwide is estimated at 360,000 and 15,000 head, respectively.

Most production units in Uruguay are relatively small, and there are no known features of livestock production (e.g., extreme livestock density) that increase the risk of disease spread. Livestock movements are allowed only under permit, and veterinary inspectors from the Division of Animal Health are present in livestock markets.

11. Policies and infrastructure for animal disease control in the region - i.e., emergency response capability.

FMD is a compulsorily notifiable disease in Uruguay, and a stamping out policy is enforced in the event of an outbreak of FMD. The Division of Animal Health has the authority, policies, and resources to rapidly detect and effectively respond to an outbreak of FMD.

Conclusions:

Based on a qualitative assessment of the risk factors related to FMD in Uruguay, APHIS has concluded that 1) FMD is not known to exist outside the Department of Artigas; 2) Uruguay maintains strict control over the importation/movement of animals and animal products from regions of higher risk and has established barriers to prevent the spread of FMD from the Department of Artigas; 3) Uruguay maintains a surveillance system capable of detecting FMD should the disease be introduced into other regions of the country; 4) Uruguay has the laws, policies, and infrastructure to detect, respond to, and eliminate any occurrence of FMD; 5) the situation in Uruguay needs to be closely monitored, but at the present time, it does not appear necessary to remove the entire country of Uruguay from the list of regions recognized by APHIS as free of FMD.

FOOT-AND-MOUTH DISEASE IN URUGUAY

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FOOT-AND-MOUTH DISEASE IN URUGUAY

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