

THE 1922 OUTBREAK OF FOOT-AND-MOUTH DISEASE IN JAMAICA

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INTRODUCTION

The island of Jamaica, which is free from foot-and-mouth disease (FMD), suffered an outbreak of this disease in 1922. Summarized herein is the report of said outbreak published in a supplement of the Jamaica Gazette of May 15, 1924, for consideration as an example of a notably successful eradication of FMD through the execution of measures planned with epidemiologic criterion, in an epoch when there is no recourse to a vaccine and without resort to mass shooting and sanitary disposal of sick and susceptible animals. Complementing this report are informations on the same subject contained in the letter H-88 dated April 2, 1952, sent by the Director of Agriculture of Jamaica to the Foot-and-Mouth Disease Research Institute at Pirbright, England, a copy of which was forwarded to the Pan American Foot-and-Mouth Disease Center.

SEQUENCE OF EVENTS

Through retrospective investigation, it was estimated that the first cases of FMD appeared on June 29, 1922, at Copse Estate in the parish of Hanover (see Fig. 1). The Government authorities took notice of the event on July 18, that is three weeks later, through a notification from a herd owner at Montpelier in the neighboring parish of St. James. The following day, the Depart-

ment of Agriculture sent a Veterinary Advisor, who made a diagnosis of necrotic stomatitis of contagious character and urged to include the said disease in the Law on Contagious Diseases of Animals. On July 22, the Veterinary Advisor reported that between 300 to 400 cattle in Montpelier were estimated to be ill, that the disease also existed at Copse, Lethe and Burnt Estates in the neighboring parish of Hanover, and that it appeared to have a tendency to spread rapidly. On July 24, the possibility that he was dealing with FMD was mentioned by the Veterinary Advisor, after one month had probably elapsed from the recognition of the first case. It was not until September 11 that diagnosis of FMD was made official. This delay, which was considered prejudicial to the eradication of the outbreak, motivated the dismissal of the Veterinary Advisor and his replacement with another veterinarian from the Ministry of Agriculture of Great Britain.

It would appear that the initial diagnosis of necrotic stomatitis was made on principle in order to avoid panic among the cattle owners and at the same time to avoid actions that may contribute to the major spread of the outbreak before control measures could be put into effect.

In this episode the last affected property was recorded on February 6, 1923 (see Figs. 2 and 3), that is the outbreak had a duration of approximately 7 to 8 months. The disease was observed in a total of 114 estates with a population of 34,467 cattle, distributed in part in 4 parishes (see Fig. 1): Hanover, St. Elizabeth, St. James and Westmoreland. Indemnity was maintained for the western third of the parish of Hanover and the major eastern parts of St. James. In St. Elizabeth only one state was affected, in the vicinity of Westmoreland.

Quarantine measures were maintained for a duration of 16 months, From July 25, 1922 to November 1, 1923.

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On December 3, 1923, the disease reappeared at Fontabelle property in the parish of Westmoreland. The last attack of the disease was on September 28, 1922, that is, 15 months previous. This new outbreak extended to a neighboring property and the episode was said to have terminated in three weeks, on December 25. On December 8, quarantine measures were re-established in all areas quarantined in 1922. The second quarantine was maintained for 9 months, and lifted on September 4, 1924.

The complete outbreak, therefore, lasted for 2 years and 2 months. Since then, there has been no other recorded case of any vesicular disease in Jamaica.

ORIGIN OF THE OUTBREAK

Even if there are no substantial proofs, it is supposed that the outbreak originated from the introduction of cattle from India. From that country departed 13 bulls on January 7, 1922, which disembarked in Kingston on February 27, where the animals were placed in quarantine together with local cattle for a period of one month, with no pathological sign observed. On April 6, five of the imported bulls were taken to Montpelier Estate. Approximately three months later, FMD was declared in a neighboring property. One week after, the disease was recognized in the Montpelier herd. It was noted in the supplement that, in Jamaica, animals are frequently able to pass through gates within the same property or enter neighboring properties. In such circumstances, one is able to assume of the phenomenon of virus transmission through healthy animal carriers.

Other possibilities are also considered, such as the arrival of 9 bulls from Great Britain between the period December 1921 to June 1922, the importation of anthrax vaccine, hay, straw, etc. But the bulls from Britain were destined to areas later affected, not in initially infected herds.

Although no definite conclusion could be made, bulls imported from India fall again as the principal suspects.

MORBIDITY

The report in the Gazette indicated that no examination was made to differentiate the number of sick animals. It was simply considered that all cattle were infected in the 114 establishments involved. This interpretation, based on infection of single herds with no attention to individual animals, is a fair criterion to assume. This in fact avoided any irrelevant efforts and is equally indicated from a sanitary point of view. It must be remembered that during that epoch there existed no support similar to what we have today for the laboratory identification of the virus and, in areas where vesicular stomatitis existed, a resort was the inoculation of cattle, swine and horses for differentiation of the virus. The diagnosis in the Jamaican outbreak of 1922-24 was based on the epidemiological characteristics of the disease; although during the initial confusion vesicular material was inoculated in a calf by scarification of the buccal mucosa. The calf reacted with lesions in the mouth and feet.

Nevertheless, in the various establishments, it was estimated that not all the cattle have been ill due to the phenomenon of natural immunity. It was mentioned that the attack was more serious in some herds and very mild in others that the owners doubted they were dealing with FMD. It cited the case of one of the first establishments affected, where it was calculated that the total herd of 600 cattle was ill, 12 of which died.

MEASURES APPLIED

On July 27, approximately one month after presentation of the primary focus, part of the parishes of Hanover, St. James and Westmoreland were placed under quarantine. Two days later, in view of the rapid spread of the disease, the entire area of the parishes involved was placed under quarantine.

Seeing that the disease continued to spread, the area of quarantine was again enlarged to include a part of the parish of St. Elizabeth. The extent of the area of quarantine was of such form as to

constitute in the southeast a natural barrier formed by hills sparsely populated by animals, the Black River and the adjacent large marshes. In October, a diminution of the significant foci was observed for the first time.

The failure of the initial measures taken was attributed to inexperience and want of preparation to deal with outbreaks of exotic diseases, the false diagnosis of necrotic stomatitis, and lack of legislation to stop the movement of animals within the quarantine areas.

To meet the situation, regulations were made according to the circumstances indicated within a new law, Law 29 of 1922. A Commission Chief was designated in charge of the group of Commissioners and Field Inspectors and supported by a Committee of Central Assessors. This Committee took the function of reviewing periodically the situation and making recommendations to the Governor. Also, Committee of Local Assessors were established in each parish to do surveillance work and to collaborate with the local Commissioner and the central authorities.

The Chief Commissioner proposed the sacrifice, with indemnification, of all small species of animals within the infected area due to the impossibility of keeping them properly confined and because of the danger they pose for the re-occurrence of the disease. For various reasons which were not specified, the Government did not accept this proposal. Nevertheless, numerous stray goats and pigs were killed in some areas considered of major risk. The exact figures or the method of elimination were not mentioned. It was admitted that the stray animals were never efficiently controlled. By chance, it appeared that the smaller livestock species did not disseminate nor maintain the infection as feared. No cases were observed among goats but only in swine in some properties and always simultaneous with cases in cattle.

Movement of animals within the area was only permitted through a special permit. Movement was highly prohibited unless otherwise ordered. No animal was permitted to leave the area and all transport was restricted to motor cars, trucks and trains. Disinfection posts were installed within the area and their boundaries, and check points were established on the roads. The rigors imposed by

the new Commission during the month of September marked a very significant favorable turn in the control of the outbreak.

On February 22, 1923, around six months after the first outbreak, the disease reappeared at Barham and Friendship Estates in the east of the parish of Westmoreland. Extreme measures were taken in the vicinity, proceeding with shooting and slaughter of pigs and goats straying on the roads. During March to July, efforts were maintained to prevent whenever possible the introduction of recovered cattle into non-infected herds or vice versa, taking into account the potential of virus "carriers". It was permitted to gather recovered animals together, that is immuned with immuned. In July, liberalization of measures was started to alleviate the problem created attendant to one year of quarantine. To alleviate problems of over-population, transfer of cattle was permitted but solely within properties located in the center of quarantine area and never into non-infected areas. The mixing of recovered and susceptible animals was made use of to observe the possible transmission of the disease through "carriers".

Since there were no other reappearance of the disease 8 months after the last case, quarantine was lifted on November 1, 1923, with the exception of those properties affected in February which were otherwise released from quarantine a month later.

Due to the lack of information, it could be assumed that the reappearance of the disease at Barham and Friendship was due to the presence of animals which for some reason escaped the infection during the first outbreak, or the introduction of susceptibles following the relaxation of quarantine measures. The measures adopted at some part in March suggested much better this possibility. In which case, this could be dealt with as an example of the phenomenon of virus transmission by healthy carriers.

Between March 31 and October 31, 1923 a slaughterhouse was put into operation at the train station in Montpelier in the parish of St. James. Nine hundred and ninety (990) cattle destined for the capital of Kingston were slaughtered. The carcasses and hides (after disinfection) were shipped by a special night train.

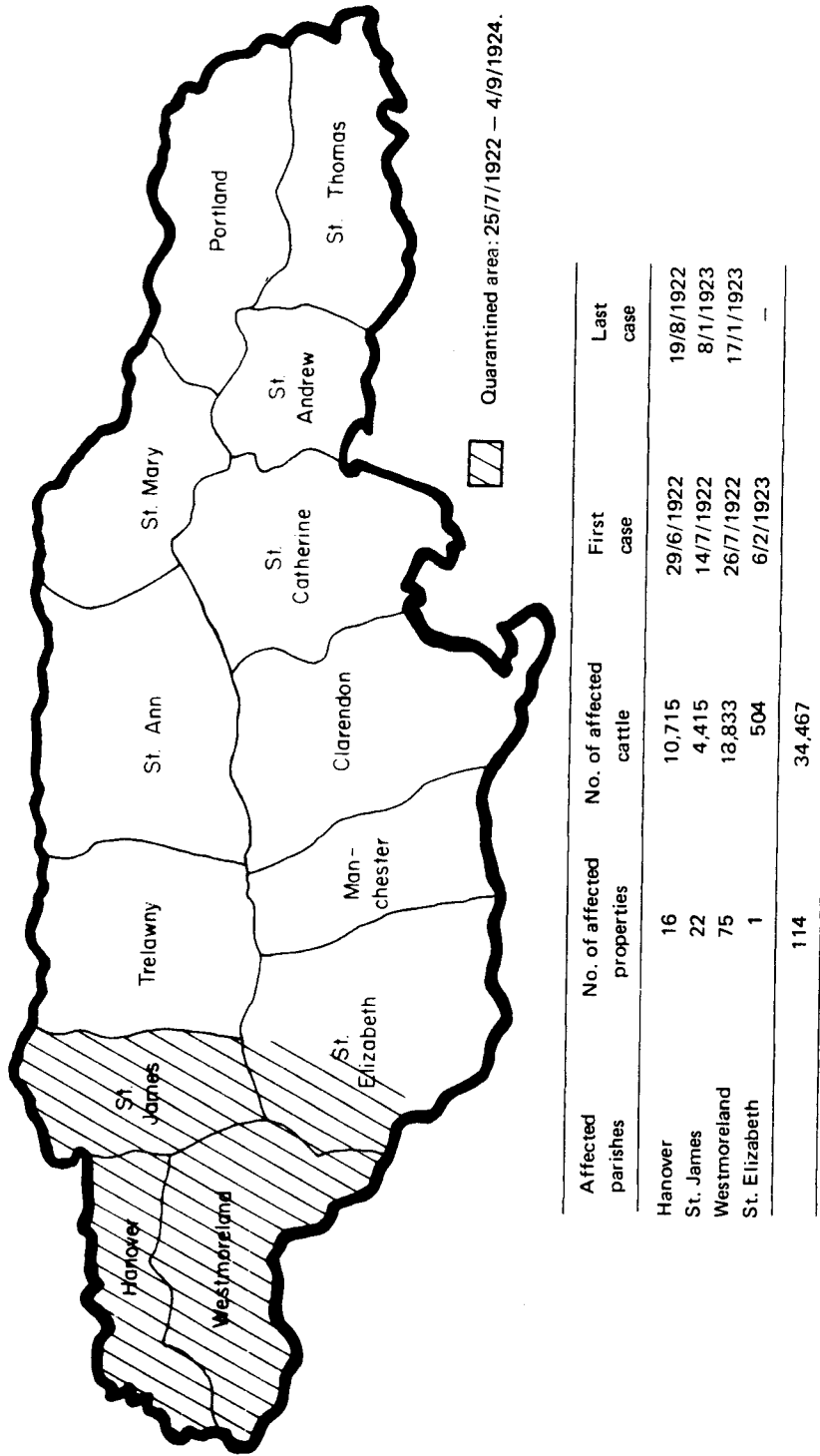


FIGURE 1. 1922/1923 outbreak of foot-and-mouth disease in Jamaica.

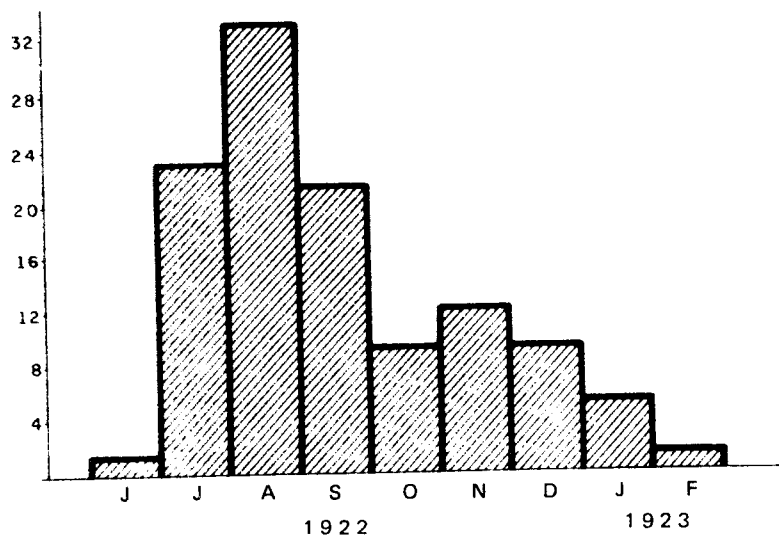


FIGURE 2. Monthly distribution of number of affected properties: 1922/23 outbreak of foot-and-mouth disease in Jamaica.

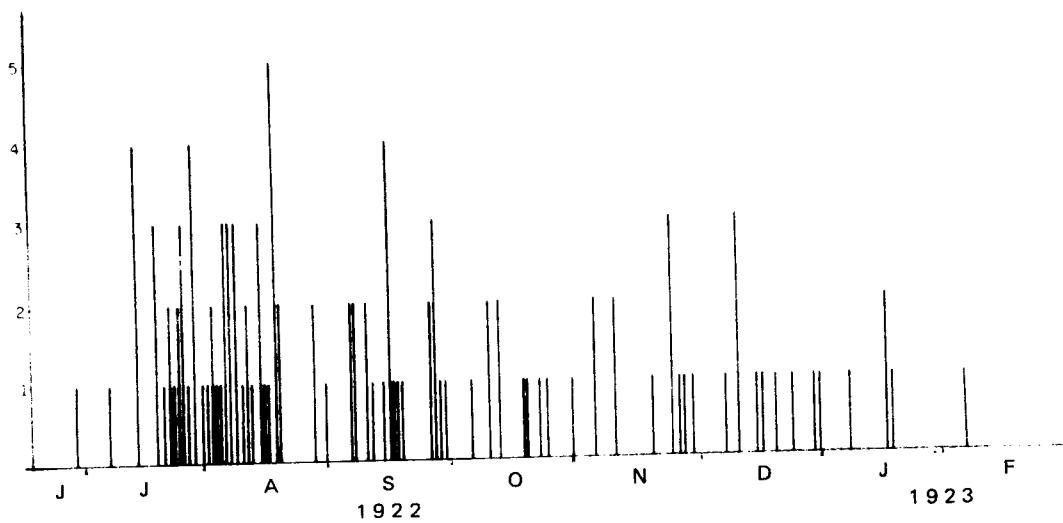


FIGURE 3. Monthly distribution of affected properties: 1922/23 outbreak of foot-and-mouth disease in Jamaica.

The disease had its last appearance at Fontabelle Estate in Westmoreland, which had suffered an outbreak in October 1922. In March of the following year, 12 bull calves originating from two properties that were never affected were received into the herd. On December 3, five of the calves were discovered to be sick and were sacrificed. Fontabelle and four properties were placed under quarantine. In total, all of the 12 calves that were introduced became ill, but only 10 of the 213 cattle which had been in Fontabelle since the outbreak of 1922. The type of animals that were ill was not described, but the morbidity pattern reveals a good level of herd immunity 13 months following the first attack. Likewise, this perhaps constituted another circumstantial proof of the phenomenon of virus survival in carrier animals and their capacity to transmit and infect other animals, a mechanism which still was not known until today.

The episode was considered terminated on December 25, but strict quarantine was maintained at Fontabelle and its neighboring properties until September 4, 1924, followed by four months of observation. All the areas that were quarantined in 1922 were declared as "suspect areas", subject to restrictions. Ruminants and pigs were prohibited to leave from yonder, with the exception of cattle destined directly for slaughter at the Kingston Abattoir. Within the interior of the "suspect area" free movement was permitted with the exception of the case of the quarantined establishments.

In summary, the western region of Jamaica was under quarantine for two years and two months, from July 1922 to September 1924, except for the three months of November 1923 to January 1924.

It was considered that the climate, predominantly hot and intense sunshine with periods of droughts, plus the natural terrain of the country, especially the barriers of mountains and marshes, were factors that contributed much to the eradication of the outbreak. Nevertheless, the dedication, perseverance and efforts of the personnel, the well elaborated plan, the energetic direction of the Commission Chief, the cooperation of the affected cattle owners and a community respectful of the

law likewise contributed to the successful eradication of the outbreak.

COMMENTS

The eradication of the outbreak of FMD in Jamaica in 1922 is an episode worthy of consideration. The idea that perhaps the same result could have been achieved without as much effort, by self-elimination of the virus in a susceptible population of a relatively reduced size, appears less possible considering the reappearance of foci and the existence in the island of a livestock population much larger than the affected area in the western part.

It is interesting to observe the success of a rational epidemiologic criterion, adapted to the circumstances and possibilities of the occasion, leaving on one side the strict method of slaughter and elimination of infected animals, which up to now is still the universal recommendation for the eradication of FMD outbreaks in countries free of the infection. The elimination applied had mainly the purpose to destroy possible links in virus spread, and at the same time urge the owners to maintain their animals in confinement. It is probable that the extension of the outbreak in the middle of July, when some 7 establishments already had FMD, and the tendency for rapid spread observed were factors that lead to disregard the method of slaughter and elimination of sick and contact animals. Soundly, this decision could have been made but it would have caused heavy losses on the economy of the country and unjustifiable due to the nature of the island of Jamaica.

Perhaps the most valuable lesson from the outbreak of FMD in Jamaica consisted of the demonstration of the importance of quarantine to halt the spread of the virus while extinguishing it in the infected herds.

The necessity for the quarantine area to have been extended and with limits corresponding with the true geographical boundaries of the parishes also stands out.

Notable is the use of the concept of healthy animal carriers of the virus, which was a determinant factor in the measures and in the duration

of quarantine. It is proper to record that this was the subject of discussion among veterinarians in Europe in the period of outbreak in Jamaica based on observation and circumstantial evidence that made them note the occurrence of this phenomenon. Afterwards, this was practically forgotten and was revived through investigations carried out around 40 years later.

That the Government authorities learned only of the existence of the problem 3 weeks after the appearance of the first focus revealed the importance of consciousness in the community, especially the cattle raisers, and the necessity of having an active system of epidemiological surveillance.

Briefly, the report in the supplement of the Jamaica Gazette points out that eradication of an extensive outbreak requires time to recognize the situation; decide as to the extent of the area of operation; prepare and approve legal regulations; control, organize and train sufficient human resources; and, above all, to inform and instruct the community in the affected areas on the nature of the disease and the methods necessary for its con-

trol. It is understood that the success depended essentially on the cooperation and sustained effort of the livestock owners and caretakers.

It is interesting to observe that among the deficiencies mentioned in the initiation of the control measures were foreseeable, when there exist no organization for the prevention and eradication of exotic diseases, such as lack of trained and organized personnel, absence of immediately available disinfectants and disinfecting equipment, inadequate legislation and delay in diagnosis.

The report summarizes in reality the principal elements that come into play in acting to prevent and eradicate and outbreak of FMD in a country or place that is free of the disease, and reveals the importance of having alternate plans to meet diverse situations that may be presented, the decisive role of the community, the necessity of a solid machinery both technical and administrative for eradication, the capacity to decide with official support at the highest level, and the condition to subject the procedures according to that indicated by socioeconomic and epidemiologic analysis of each situation.