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ERADICATION OF FOOT-AND-MOUTH DISEASE IN CHINESE TAIPEI

Submission by Chinese Taipei

Introduction

1. Foot-and-mouth disease (FMD) is a highly contagious animal disease, which affects a wide variety of susceptible species. The disease is a "List A" disease for Chinese Taipei and the World Organization for Animal Health (OIE).

2. Two FMD epidemics occurred in Chinese Taipei in the early part of the last century, the first between 1913 and 1916 and the second between 1924 and 1929. Following the eradication of FMD in 1929, Chinese Taipei remained free from the disease for the next 68 years, until March of 1997, when a case of FMD was reported in pigs.

3. The disease spread across the island of Taiwan, resulting in economically serious losses in pig production and related industries. A policy of stamping out and blanket vaccination was adopted immediately, which controlled the epidemic. At the same time, with the objective of bringing Chinese Taipei back to FMD-free status, a 3-stage eradication programme was launched. Two years later, in June 1999, FMD struck Chinese Taipei again, this time in ruminants. In February 2001, in a routine inspection at a slaughterhouse, the disease was found to be infecting three pigs. Pigs with the clinical symptoms were destroyed to prevent the disease from spreading and since then up to the present time, no further case of FMD has been reported.

Past outbreaks of FMD in Chinese Taipei

The outbreak in 1997

4. The first FMD case was confirmed on 19 March 1997. After that, a total of 6,156 pig farms - about one-quarter of all the pig farms in Chinese Taipei - were reported as being affected. By the end of the year, 1,012,000 pigs on those farms had been found to have the clinical symptoms. Eventually, 184,286 pigs died of the disease and 3,851,170 were slaughtered. The disease was brought well under control within two months of the outbreak by means of stamping out and blanket vaccination.

5. Studies of the FMD that occurred in 1997 indicated that the virus strain, namely O/Taiwan/97, is a pig-adapted type which cannot infect ruminants. It can cause high morbidity in the pig population and high mortality in baby pigs.

The outbreak in ruminants in 1999

6. In June of 1999, another O-type strain of the FMD virus, later named O/Taiwan/99, was identified in the beef cattle population of Kinmen Island by the disease-monitoring and surveillance programme, using the FMD virus non-structural protein (NSP) methods, ELISA and RT-PCR. The

infected beef cattle showed no clinical symptoms, but displayed with sero-conversion, which could be detected by serological testing techniques.

7. The disease was later transmitted to six beef cattle farms on Taiwan Island through co-habitation with infected beef cattle that were brought from Kinmen Island for slaughtering. The diseased animals on Taiwan Island also showed no clinical symptoms of the infection but displayed with sero-conversion in the same way as those of Kinmen Island.

8. In early 2000, infection by the disease was reported in one beef cattle, two dairy cattle and two dairy goat farms. Clinical symptoms of the disease were displayed in dairy cattle and dairy goat, but no mortality occurred in the adult population. However, mortality was recorded in young animals due to heart failure, showing indications of "tiger heart".

9. Studies of the O/Taiwan/99 strain showed that it can infect not only ruminants but also pigs. However, the strain has never been detected in infected pigs in the field. It does not produce clinical symptoms in beef cattle, but it does in dairy cattle and dairy goat. However, it displays with sero-conversion in all infected ruminants.

The last outbreak

10. When the first case of FMD in cattle was identified in Kinmen Island in 1999, an intensive serological survey was implemented using the FMD virus NSP ELISA method, which continued until the end of the year 2000. In fact, from February 2000, when the last case of the disease was detected on dairy goat farms, through to the end of the year, a total of nearly 20,000 sera were collected from cattle and goats. The final result of the full serological survey was that no farm could be detected as having the infection.

11. However, on 25 February 2001, three FMD-infected pigs were found by a routine inspection carried out in the pen of the slaughterhouse located in the Taipei prefecture. Both the antigen ELISA test and virus isolation confirmed the infection. All pigs were destroyed immediately when clinical symptoms were observed. Disinfection procedures at the slaughterhouse were strengthened and an intensive programme of tracking inspections was conducted to find the source of the disease. The source farms were identified and they all had full FMD-vaccination records. No other FMD case was found in subsequent tracking inspections. No further case of FMD has been reported since that last outbreak in February 2001. Outbreaks that have occurred in Chinese Taipei since 1997 are listed in the table below:

FMD outbreaks in Chinese Taipei since 1997

Strains of FMD virus	Outbreak time	No. of outbreaks	No. of destroyed animals	Animal species	Clinical signs
O/Taiwan/97	1997	6,156	3,851,170	Swine	Yes
	1998	6	467	Swine	Yes
	1999	6	793	Swine	Yes
	2000	1	5	Swine	Yes
	2001	1	3	Swine	Yes
O/Taiwan/99	1999	10	663	Beef cattle	None
	2000	1	2	Beef cattle	None
		2	263	Dairy cattle	Yes
		2	61	Goat	Yes

FMD eradication strategy in Chinese Taipei

12. A policy of stamping out, emergency vaccination and movement restriction was implemented in the 1997 outbreak. After gaining control of the epidemic, the government launched a 3-stage eradication programme designed to put Chinese Taipei back on the list of FMD-free countries as soon as possible. After full discussion, the programme was developed by a working group composed of researchers, experts, specialists, producers and government officials.

(a) Control stage

This first stage focuses on the compulsory vaccination of all cloven-hoofed animals. The goal is to bring the incidence rate of FMD down to zero.

(b) Eradication stage

In this second stage, the compulsory vaccination programme continues for two more years with a zero incidence rate, alongside the implementation of a nationwide FMD surveillance programme. The goal of this stage is to reach FMD-free status through the practice of vaccination. This stage is being implemented currently in Chinese Taipei.

(c) Surveillance stage

When the results of monitoring and surveillance programmes indicate that no virus has been detected on animal farms, the third and final stage of the eradication programme is entered into. Vaccination is stopped and a stamping-out policy is adopted. The surveillance programme is continued in order to gather more evidence of the non-existence of the virus.

Measures taken in the eradication programme

13. The measures described below have been executed according to guidelines laid down in the eradication programme:

(a) Education and extension

Education is aimed at informing the general public that the country is in the process of eradicating FMD. Further education courses are given annually to livestock producers, livestock traders, and the staff of government and private organizations, to raise their awareness of the nature of FMD and to draw their attention to the potential impact of the disease on them and the industry. All forms of mass media - radio, television, video, advertising, the press and a variety of other printed material (booklets, pamphlets, posters) - as well as seminars or exhibitions, are used to achieve the purpose.

(b) Compulsory mass vaccination

A mass FMD vaccination programme has been carried out since 1997. Based on "Regulation of Kinds of Vaccines and their Management for Eradicating Classical Swine Fever and Foot and Mouth Disease", promulgated in Chinese Taipei on 10 September 1997, it is compulsory for all cloven-hoofed animals to be vaccinated. Swine, sows, boar and ruminants have to be vaccinated twice a year, and porkers between 8 and 16 weeks old are vaccinated twice, at an interval of 4 weeks.

Each cloven-hoofed animal farm has to have a vaccination record, which must be certified by the veterinarians in order to confirm the vaccination of animals and check the rate of

vaccination. When transported to the slaughterhouse, the cloven-hoofed animals shall have immune certificates authorized by the veterinarians, to prove their vaccination status. The owners of the animals will be penalized by a fine of NT$ 10,000 to NT$ 50,000 (roughly US$ 1,994 to US$ 9,970) if they either do not have an immune certificate or have not vaccinated their animals. In order to strengthen the management of vaccination, the government launched the vaccine stamp system in October 2001. With this system, the government provides one stamp with each dose of FMD vaccine. Animal owners are required to attach the stamps to the immune certificate, which represents the number of vaccines that have been used on the certified animal. Once an animal has been vaccinated at least twice, it will have two corresponding stamps attached to the immune certificate as proof of vaccination. The stamps are then collected along with the immune certificate.

In order to help small producers to vaccinate their animals, action has been taken by the government since June 2002, to purchase vaccine and arrange for veterinarians to conduct the vaccination by charging the small producers.

(c) Epidemiological reporting system

Because FMD is a notifiable disease, in the event of an FMD outbreak, veterinary practitioners or producers are obligated to report the disease to the prefecture or city veterinary authorities (Livestock Disease Control Center, LDCC). The reports shall be sent to the Bureau of Animal and Plant Health Inspection and Quarantine (BAPHIQ). The sera and fluid of vesicles of suspected animals will be collected for ELISA testing and virus isolation in order to detect whether there is FMD infection. Epidemiological investigation will be conducted to identify the source of infection and the possible extent of the spread, so as to give a full picture of the state of the disease. After compiling all the reports, BAPHIQ will send a report to the OIE.

A disease-reporting software system has been in use since 1999. This provides a link by computer network to all levels of government veterinary agencies. As a result, the latest, updated disease situation is at the fingertips of anyone who has the authority to access the system.

The government also uses a system of rewards to encourage producers to report the occurrence of FMD on their farms, or the farms of others. A subsidy, equivalent to 10% of the total amount of compensation paid for animals slaughtered, will be provided to producers who report the occurrence of the disease on their farms. Those who fail to report the occurrence of the disease on their farms will be fined NT$ 10,000 to NT$ 50,000 and no compensation will be paid for slaughtered animals.

(d) Strengthening of bio-security at the farm level

The disease can be transmitted from one infected farm to another through mechanical or biological means. Any movement of man, animals, equipment and trucks is therefore controlled and disinfected by using appropriate disinfectants on both the infected and the disease-free farms, in order to stop the spread of the disease. Routine cleaning and disinfecting procedures for equipment and facilities on the farms is the basic health management work of the producers. Selecting the appropriate disinfectant for the disease is also essential.

(e) Disinfection in the meat markets and slaughterhouses

Because healthy animals are sent to meat markets for sale or slaughter, the meat markets and slaughterhouses play a very important role in reducing the spread of the disease from one place to another. The cleaning and disinfecting of trucks whenever they enter or leave the meat markets or slaughterhouses is of paramount importance. Routine disinfection of facilities in the meat markets and slaughterhouses is also important. Since the two last epidemics struck exactly these places, their cleaning and disinfecting procedures have been strengthened. The lairages are required to be disinfected at the end of each day's auction and slaughtering, and the entire area of each meat market and slaughterhouse is disinfected on four rest days of every month. The LDCC staff working in the meat markets and slaughterhouses supervise the disinfection activities in these areas.

(f) Monitoring and surveillance

The surveillance programme is directed by a specialist group, which decides on the sampling size, testing techniques and other related measures. In this programme, serum samples from cloven-hoofed animals are collected from meat markets and farms, and tested by serological testing techniques. The NSP antibody testing technique is used to verify the infection status. These serological tests provide an opportunity to trace the farms suspected of being infected, even those with animals being vaccinated. Animals on these suspected farms will be treated with compulsory re-vaccination twice and checked at an interval of once every six months until they become free of the FMD virus.

(g) Emergency plan for FMD outbreak

Whenever an FMD outbreak is suspected, veterinarians from LDCCs shall respond immediately with the following control measures:

(i) Restrict the movement of animals from the infected farm. All of the sick, suspected and possibly infected animals must be destroyed.

(ii) Disinfect the infected farm.

(iii) Animal movement shall be put on hold within the infected farm until no further cases have been found for a continuous period of two weeks.

(iv) Boosted vaccination may be required if deemed necessary.

(v) Investigation shall be carried out on the infected and neighbouring farms to collect epidemiological information.

(h) Antigen and vaccine reserve

In case other types of FMD may invade Chinese Taipei as a result of increases in international animal trade, or smuggling activities, antigen and vaccine reserves have been planned and put in place. The three FMD viral strains most commonly occurring in neighbouring countries and our trading partners - A22, Asia-1 and C1 - have been selected. Reserves consist of 100,000 doses of ready-to-use FMD vaccines of each selected strain (stock at National Institute for Animal Health) and 1.25 million doses of each of the three antigens mentioned above (stock at Bayer Company).

Conclusion

14. The last cases of FMD in ruminants and in pigs in Chinese Taipei were in February of 2000 and 2001 respectively. As a result of the efforts made in implementing the strategic plan and programme, no further case of FMD has been reported to date. The current goal is to reach FMD-free status through vaccination. With its continued implementation of the eradication programme, Chinese Taipei is looking forward to officially becoming FMD-free again very soon.