APHIS/CFIA site visit – FMD outbreak in the Netherlands
August 15-17, 2001

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The team visited the Netherlands August 15-17, 2001. Discussions were held with representatives of various sections of the Ministry of Agriculture, Nature Management and Fisheries in the Hague. The Regional Crisis Center in Stroe was also visited. The visit was primarily arranged and conducted by Dr. Fritz Pluimers, Chief Veterinary Officer, and Dr. Ton Akkerman, Deputy Chief Veterinary Officer. Other members of the various agencies involved presented information and contributed to the site visit.

The Netherlands had a total of 26 confirmed cases of FMD during the outbreak. The first case was confirmed on March 20, 2001, and the last case was confirmed on April 22. Vaccination was used as one of the control measures, with the eventual slaughter of all vaccinates. By June 26, 2001, all restrictions applied to the Netherlands in Community legislation had been removed.

There are 2 separate agencies involved in disease control in the Ministry of Agriculture, Nature Management and Fisheries – the Department of Veterinary and Food Policy and General Environmental Affairs (VVM) and the National Inspection Service for Livestock and Meat (RVV). In broad terms, the VVM is the policy arm of animal disease control and the RVV is the operational agency. These 2 agencies are assisted by the investigative and compliance functions of the General Inspection Service, laboratory functions at the Institute for Animal Health and Husbandry, and a contractor, the Animal Health Service. The VVM is the agency which drafts legislation, sets policy and advises the Minister. It has 2 sub-departments – veterinary trade control and animal health. The Animal Health Service is a private organization, run by producers, which works for the government under contract as necessary.

The RVV is the agency that ensures that animal and public health regulations are applied in the field. This includes approval of various processing establishments, meat inspection, border inspections, export certification of animals and products, eradication of animal disease, and supervising the national residue plan. The RVV has a Central Directorate and 5 regions, with a total of approximately 1600 employees.

After the outbreak of classical swine fever in 1997/98, there was a public reaction to the high cost of control measures for such outbreaks. The public perception was that general government funds should not be used to pay for these outbreaks. Consequently, an agreement was reached in 2000 between the government and various product boards to

create a new disease eradication fund. The product board sets defined fees to be collected per animal or amount of milk, with a defined goal to be collected in 5 years. These goals are as follows:

Bovine	45 million euro
Pig	23 million euro
Poultry	12 million euro
Sheep/goat	2.2 million euro

In addition, the bank guarantees a fund of 225 million euros each for the bovine and swine industries. These funds are used to pay 100% of eradication costs and 50% of disease monitoring.

Outbreak chronology:

20 February 2001 – FMD confirmed in UK
23 February – culling of UK imports
13 March – FMD confirmed in France
16 March – culling of French imports
17 March – pre-emptive cull of goats with suspect FMD, Oene
21 March – FMD confirmed in Netherlands, Olst
22 March – 2nd Netherlands case confirmed, Oene
26 March – suppressive vaccination begun
3 April – larger FMD suppressive vaccination zone Noord Veluwe established after 12 confirmed cases
11 April – FMD confirmed in Ee, Friesland
22 April – last FMD case confirmed in Netherlands, Wijhe
9 May – final screening begun
25 May – last vaccinated animal culled
25 June – all restrictions in Community legislation removed

During the course of the outbreak, a total of 26 cases of FMD were confirmed, an additional 3 farms had seropositive results, and a total of 7 general restricted areas were established. Approximately 3,000 farms were culled, with a total of approximately 265,000 animals. This included about 1000 small backyard flocks. The daily operations involved about 200 veterinarians, 400 technicians and assistants, and 150 administrative personnel.

Preventive measures:

In response to the confirmation of FMD in the UK, all imports of biungulates from the UK were traced. Farms that had imported sheep and deer from the UK were pre-emptively culled. Imported pigs were inspected clinically and serologically. All UK imports were serologically negative.

At the same time, a collection ban was instituted, preventing the use of assembly points for animal movements. A general transport ban was instituted for sheep and goats, and all transport vehicles used to move biungulates were to be cleaned and disinfected after unloading.

Similar measures were taken after confirmation of FMD in France with tracebacks on imports. All French imports were serologically negative. In addition, the previous transport ban for sheep and goats was expanded to a transport ban for all bi-ungulates.

On 15 March, goats on a farm in Oene were reported to have clinical signs consistent with FMD. These animals were negative on an IDAS-ELISA at that time. The farm was visited again the next day. On this visit, the previously sick animals were recovering but other goats were now exhibiting similar symptoms. Some animals were euthanized and the post-mortem examination suggested FMD. The IDAS-ELISA gave doubtful results. This premise was pre-emptively culled on 17 March. Confirmation of the FMD virus through virus isolation was obtained for this premise on 22 March and it was defined as outbreak number 2001/03.

On 20 March, a premise in Olst located across the river from the goat farm in Oene reported cattle with clinical signs of FMD. These animals were positive on the IDAS-ELISA on 21 March, and this was the first confirmation of FMD in the Netherlands as outbreak 2001/01.

Outbreak summary:
Additional specifics are included in detailed final reports provided during the site visit (Final Report Noord-Veluwe, Oosterwolde, Noord Friesland, and Kootwijkerbroek)

The FMD outbreaks in the Netherlands apparently started with the introduction of the virus on 24 February through the import of infected calves from Ireland via France. A shipment of veal calves originated in Ireland and stopped overnight at a rest stop in Mayenne, France. Infected sheep from the UK had been previously housed in this area in Mayenne. The calves were delivered to a mixed farm in Oene, and FMD was confirmed in goats on this premise (outbreak 2001/03) on 22 March. This was presumed to be the index case.

Animals on the same transport from Mayenne were delivered to several premises. In addition to the premise in Oene as described, animals were delivered to a premise in Sprang-Capelle and one in Beesd. No virus was found on either of these premises.

At the time of detection of the index case, more herds in the immediate neighborhood were already infected. Six other herds were infected due to contact with the index herd, and these then infected a third generation of herds. Due to the spread of the disease, it became impossible to complete pre-emptive culling within a 1 kilometer zone around the outbreaks. After confirmation of infection, pre-emptive culling around an infected premise has to be done within four days. There was not sufficient capacity to cull all of the animals in these zones within that time frame. Therefore, a decision was made to use suppressive vaccination within a zone of 2 km aound the outbreaks. This was begun on 26 March. The vaccination area in the Noord Veluwe area was later expanded as described below.

A total of 26 farms were confirmed as infected with FMD in the course of the outbreak. Another 3 farms had seropositive results but infection was not confirmed for various reasons. All of these premises were in the Noord Veluwe vaccination area. One farm with sheep was screened serologically prior to vaccination on 14 April. All 16 sheep tested were seropositive for antibodies against FMD. The herd was preemptively culled on 26 April. The second instance was a sheep farm located near the index herd. This herd was tested seropositive at culling, but no signs of FMD were seen. The third premise was also located near the index herd. Clinical signs were seen on the premise on 22 March and the herd was culled on 27 March. Serological results were extremely delayed from these animals due to confusion over matching the results with the samples sent, but some of these were serologically positive.

There were four vaccination areas, summarized as follows:
Noord Veluwe –

There were a total of 21 outbreaks within this vaccination area which included the index case. This area encompassed the original 2 km suppressive vaccination area around the initial outbreaks. Approximately a week after vaccination was started, outbreaks had occurred outside the vaccination area and therefore the boundaries of the suppressive vaccination area were expanded. On 3 April, the vaccination zone Noord Veluwe was established. Within this vaccination area, susceptible animals were vaccinated in accordance with Commission Decision 2001/246/EC, and all farms within this area were later culled. In total in this area, animals were culled from 2279 farms. Of these, 1786 farms were vaccinated and 493 were not vaccinated. The culled but not vaccinated farms were either those farms which were pre-emptively culled shortly after confirmation of the outbreak or small backyard flocks which had sheep or goats as pets. A total of 187,794 animals were culled. The last herd was culled on 11 June. The last vaccinated herd was culled on 25 May. After 25 May, only the remaining small backyard flocks were culled.

Final screening was done in the protection and surveillance zones as described elsewhere. In the Noord Veluwe area, a total of 4964 farms were screened in the protection and surveillance zones. In total, 14,484 serum samples were taken as part of this screening. Of these samples, a total of 3 were found to be positive, all from farms within the surveillance zones. These farms were reexamined and tested again as necessary. On 2 premises, the positive animals were singleton reactors, and on the third premise, the positive animal was an older previously vaccinated cow.

Oosterwolde –

There were 2 outbreaks in this area, numbers 2001/09 and 2001/10. The first outbreak in this area was confirmed on 28 March in a herd which had been depopulated on 21 March. This outbreak was epidemiologically linked to the index herd – 2001/03. Vaccination in a 2 km area around the outbreaks was started on 29 March. In total in this area, animals were culled from 59 farms – 21 vaccinated and 38 not vaccinated. A total of 5219 animals were culled, with the last vaccinated herd culled on 9 April and the last cull on 2 May.

Final screening was done in the protection and surveillance zones on a total of 788 farms. A total of 11,741 serum samples were taken as part of this screening. Of these, one sample from the surveillance zone was positive and this was determined to be from a singleton reactor.

Kootwijkerbroek –

There was one outbreak in this area, number 2001/08, which was epidemiologically linked to the index herd – 2001/03.. On this premise, clinical signs were initially noted on 20 March, and samples were obtained on 21 March. The herd was culled on 27 March and virus was confirmed on 28 March. The owner of this premise had another farm in the surveillance zone, and this was pre-emptively culled on 28 March. No virus was detected on this farm, however. Control measures in this area were met with resistance from local farmers, which delayed the disease control operations.

Vaccination in the 2 km area around the outbreak started on 28 March. In total in this area, animals were culled from 207 farms – 147 vaccinated and 60 not vaccinated. A total of 55,314 animals were culled, with the last vaccinated herd culled on 14 May and the last non-vaccinate cull completed on 14 May. Final screening was done on a total of 2455 farms. A total of 8889 serum samples were taken as part of this screening. Of these, one sample from the surveillance zone was positive. This was determined to be a false positive.

Friesland -

There were 2 outbreaks in this area, numbers 2001/22 and 2001/25. Outbreak 2001/22, in Ee, was initially reported on 10 April. The farm was culled on 11 April. The second farm in this area – 2001/25 – was reported on 11 April and culled on 12 April. To date, no cause has been found for the spread of the virus to this area. In addition, no links have been found between the 2 outbreaks in this area.

Vaccination in the 2 km zone around these outbreaks was begun on 12 April. In total in this area, animals were culled from 110 farms – 34 vaccinated and 76 not vaccinated. A total of 10,868 animals were culled, with the last vaccinated herd culled on 18 April and the last non-vaccinated animal culled on 21 April. Final screening was done on a total of 1878 farms. A total of 12,198 serum samples were taken as part of this screening. Of these, one samples from the protection zone was positive. This was determined to be due to previous vaccination in an older animal.

<u>Control measures:</u>

Protection and surveillance zones were established around each outbreak as defined in Community legislation. In general, a vaccination zone of 2 km around each outbreak was established. A protection zone with a radius of at least 4 km was established around this, and a surveillance zone with a radius of at least 10 km around each vaccination area was established. Movement of animals and untreated products from these zones was generally prohibited by both Dutch legislation and Community legislation. Enforcement and monitoring of the transport bans and movement controls was done by the General Inspection Service, with assistance from the police, military police and Customs in some

areas. Road blocks were established around vaccination areas, and otherwise patrols were used in areas of limited movement.

Vaccination was done using an inactived vaccine based on subtype O-Menissa. This vaccine was obtained from Lelystad and was originally intended for the export market. Since it was readily available it was used in the outbreak situation. Suppressive vaccination of all susceptible species was carried out in a total of 4 vaccination areas as described later. In each outbreak area, culling started around the infected premises, and vaccinations were carried out from the outside border of the vaccination area.

Official veterinarians carried out the vaccinations, working in teams from the local crisis centers as assigned. A team of a veterinarian and 3 assistants could complete vaccination of 2-2.5 farms per day. All animals to be vaccinated were clinically examined prior to vaccination and serum samples were obtained. The serum sample size was based on a protocol to detect a disease prevalence of 5% with a confidence interval of 95%. Vaccinated animals were marked by mutilation of the ears. This was done with an ear punch, with 2 varieties of punch shapes. All vaccinated animals were culled. The time from vaccination to cull ranged from 4 days in the smaller areas to approximately 14 days in the largest vaccination area. There were a few instances of disease outbreaks in vaccinated animals, 2-3 days after vaccination. In general, it appeared that outbreaks stopped approximately 4 days after vaccination was completed in an area.

Final screening within the protection and surveillance zones was begun at least 21 days after culling and preliminary disinfection of the last infected premise in each area. This screening was done according to the following protocols:

- Protection zone: all farms visited and clinically inspected. Farms with sheep, goats and young dairy cattle clinically inspected and serologically sampled, with a sample size to detect a herd prevalence of 5% with a 95% confidence interval. Farms with fattening cattle or pigs were clinically inspected.
- Surveillance zone: all farms visited and clinically inspected. A total of 150 farms were randomly chosen for serological sampling, with sampling per herd done based on a sample size to detect a herd prevalence of 5% with a 95% confidence interval.

<u>Compartmentalization and other policy changes:</u>

The Netherlands experienced an outbreak of classical swine fever in 1997/98 and made some policy changes in the pig sector in response to that outbreak. The major lesson learned from the CSF outbreak was that assembly points present a risk of transmission in any disease outbreak. Therefore, additional hygienic measures were instituted. Trucks used to transport pigs must be cleaned and disinfected after every consignment; therefore, essentially every farm has some type of cleaning facility. After every 4 consignments, this must be done at an official cleaning and disinfection point. Pigs can only be assembled for the same purpose – i.e., only for slaughter or export in any given consignment, but not both. Contacts between different epidemiological units are minimized – pigs are moved between farms only once in their lifetime. Movements must

be requested and approved. The requested is notified by the farmer to the Central Database, and if too many movements have already taken place the request will be denied. There is compulsory clinical monitoring of pigs by a veterinarian every 4 weeks.

Similar problems were noted with cattle and sheep movements during the FMD outbreak and additional policies were changed in response. Collection of animals at assembly points is done under more strict conditions, and all animals at a collection point may have only one destination. Animals may only move to a slaughterhouse from a market. A farm which receives animals is quarantined for 30 days after arrival of the new animal. For cattle collection points, the country has been divided into 4 zones. Cattle, including veal calves, may only move to a collection center in the same zone. Additional monitoring for FMD will be done in both sheep and cattle – all sheep in the country are supposed to be examined clinically before September 8, 2001; random serological testing of sheep at slaughter will be done, with samples obtained from every epidemiological unit; and farms with veal calves will be clinically examined every four weeks with serological testing after imports.

Compartmentalization of the transport system in the country had previously been established during the CSF outbreak. The country was divided into 2 compartments – north (N) and south (Z). Trucks which transport animals, products, and associated things such as feed or manure can only move in one compartment. The trucks were given a sticker reflecting their chosen location in one compartment. Thus, only trucks with that compartments sticker were allowed to transport products in that compartment. Trucks could only move between compartments if they were cleaned and disinfected at an official site and then sat idle for 72 hours. This same system was used during the FMD outbreak.

General comments

The information provided the team with a good understanding of the actions taken in response to the outbreak. It appeared that these constituted an effective, efficient, and timely response to incursion of a foreign animal disease.