

Carcass disposal: lessons from the Netherlands after the foot and mouth disease outbreak of 2001

P.F. de Klerk

Ministry of Agriculture, Nature Management and Fisheries (LNV), National Inspection Service for Livestock and Meat (RVV), P.O. Box 3000, 2270 JA Voorburg, The Netherlands

Summary

The main logistical problems of the foot and mouth disease (FMD) outbreak that occurred in the Netherlands in 2001 were a lack of culling and rendering capacity. Suppressive vaccination formed the basis for the solution to both problems and was primarily used to halt the possible spread of the virus. This allowed culls to take place on vaccinated farms when sufficient culling capacity eventually became available. In addition, the vaccinated cloven-hoofed animals could be removed alive and then killed in central culling places fourteen or more days after vaccination. Using slaughterhouses as central culling places meant that parts of carcasses could be deep-frozen, which solved the lack of rendering capacity. The deep-frozen carcass parts were destroyed later, when rendering capacity became available. To guarantee that all vaccinated, culled and temporarily deep-frozen cloven-hoofed animals were eventually destroyed, a balanced audit trail, partly based on kilogram records, was vital in this situation.

Keywords

Audit trail – Carcasses – Cold-storage plants – Culling capacity – Disposal – Foot and mouth disease – Netherlands – Rendering capacity – Slaughterhouses – Vaccination.

Introduction

On 21 March 2001, the first outbreak of foot and mouth disease (FMD) for 14 years was confirmed in the Netherlands. The entire operation to control the disease (from the first outbreak to the day when the last restrictions were lifted) took 96 days. Due partly to experience gained during the classical swine fever (hog cholera) outbreak in 1997 and 1998, this outbreak was tackled more effectively than might otherwise have been the case. The experience gained during the classical swine fever period was also useful for the carcass destruction and disposal procedures. Nevertheless, a number of obstacles arose during the campaign. This paper describes how carcasses were destroyed, the bottlenecks encountered and the solutions eventually employed.

This analysis is divided into a number of sections, namely: facts and figures, bottlenecks, logistical handling of carcasses, milk and manure, overview of the processes employed, disposal of produce and other substances on farms where culling was conducted and lessons learned.

Facts and figures

The following facts and figures give an indication of the magnitude of the FMD campaign. Culls were carried out on 2,936 farms, a mere 26 of which were infected. Apart from these 26 infected farms, serologically positive cloven-hoofed animals were found on three farms. In total, 1,709 of the 2,936 farms stocked small backyard herds, with ten or less animals. A total of 270,222 cloven-hoofed animals were culled because they were infected or were culled pre-emptively. Of these, 89,882 were cattle, 135,444 pigs, 34,861 sheep, 9,615 goats and 420 other cloven-hoofed animals. The other cloven-hoofed animals included fallow deer (*Dama dama*), red deer (*Cervus elaphus*), llamas, dromedaries, Scottish highlanders and one muntjak or barking deer (*Muntiacus reevesi*). In total, these cloven-hoofed animals accounted for 44,800 tonnes of rendering material. In addition, 118,786 cloven-hoofed animals were killed on 211 farms as part of a purchase scheme (cloven-hoofed animals located within the restricted areas, killed because of welfare problems). These comprised 24,173 calves (82 farms), 43,638 fattening pigs (99 farms) and 50,975 piglets (30 farms). A total of 13,100 tonnes of rendering material was purchased, as

follows: 5,000 tonnes from fattening pigs, 1,300 tonnes from piglets and 6,800 tonnes from calves.

During the initial period of the FMD outbreak, 15 culling teams were deployed simultaneously. However, in comparison with the culls performed during the classical swine fever episode of 1997-1998, culls on dairy farms in particular created much emotion both among farmers and the National Inspection Service for Livestock and Meat (RVV: Rijksdienst voor de keuring van Vee en Vlees) staff. Culls on these farms took more time than expected and during the course of the epidemic, the number of culling teams was raised to 40.

The Netherlands possess two rendering plants. One is situated in Burgum, in the province of Friesland, in the north of the Netherlands, the other in Son, in the province of North Brabant, in the south of the country. The two rendering plants combined have a total capacity of 21,000 tonnes per week. Every week, some 15,500 tonnes of this total capacity is used to dispose of slaughterhouse material. This leaves a capacity of 5,500 tonnes per week to control animal diseases. These 5,500 tonnes can be raised by 1,750 tonnes per week by using particular supply flows, namely disposal elsewhere of low-risk material that normally enters the rendering line.

Bottlenecks and solutions

Two major logistical problems arose during the campaign. The first was a lack of culling capacity. By the time the culling capacity had been increased sufficiently, the second problem arose, i.e. a lack of rendering capacity. This second problem was exacerbated during the course of the outbreak because the longer an epidemic, the higher the rise in the number of cloven-hoofed animals afflicted by welfare problems. The more cloven-hoofed animals afflicted by welfare problems, the more these animals are offered for purchase. This again increases the demand for rendering capacity.

Culling capacity

Initially, the culling capacity was insufficient to deal with all farms where pre-emptive culling was required (i.e. all farms situated within a 1-km radius around an infected farm) within 96 hours of the infection being confirmed. The solution chosen to overcome this problem was to carry out suppressive vaccination. This contained the possible spread of the virus and allowed culls on farms to be postponed until sufficient culling capacity was available (delayed destruction). Suppressive vaccination performed on farms located around infected farms also allowed all the culling capacity available to be used for culls on newly infected farms and suspected farms where cloven-hoofed animals showed clinical signs of FMD.

Suppressive vaccination was initially performed in an area within a 2-km radius around infected farms (2). When new outbreaks were confirmed outside the 2-km vaccination areas,

a wider vaccination area was introduced (3). This new vaccination area, North Veluwe, was contained within natural boundaries, such as rivers and railroads. Vaccination in these areas was performed from outside to inside and culling was carried out from inside to outside.

The cloven-hoofed animals on a farm were examined clinically before vaccination. Serum samples were also taken before vaccination. Sampling was carried out within a confidence level of 95% and 5% prevalence. All vaccinated cloven-hoofed animals were identified with a special mutilating earmark.

An added advantage was that vaccinated cloven-hoofed animals could be removed alive from farms 14 or more days after vaccination for killing in central culling places within the restricted area. This resulted in a substantial increase in culling capacity. During the FMD outbreak, cloven-hoofed animals (166,747 in total, i.e. 53,483 cattle, 88,267 pigs, 19,643 sheep, 5,295 goats and 59 other cloven-hoofed animals, equivalent to 27,200 tonnes) were removed alive from 1,619 farms to central culling places.

Rendering capacity

Once culling capacity was no longer a constraint, rendering capacity presented a problem. The use of available rendering capacity had to be prioritised. Priorities were fixed as follows:

- carcasses from infected farms
- carcasses from farms where cloven-hoofed animals showed clinical signs of FMD
- carcasses from farms where pre-emptive culling was performed and where there had been no suppressive vaccination
- carcasses from farms where pre-emptive culling was performed and where there had been suppressive vaccination
- carcasses from the purchase scheme (killed because of welfare problems).

Initially, the movement of all types of animals, manure and animal products was totally banned for 72 hours throughout the Netherlands. Due to the restrictions on the movement of cloven-hoofed animals, slaughterhouses were closed, resulting in a stream equivalent to zero of rendering material from the slaughterhouses. Consequently, at the start of the epidemic, more rendering capacity than usual was available for animal disease control.

Later, after suppressive vaccinations had been carried out, vaccinated cloven-hoofed animals were removed alive from farms and killed in slaughterhouses within the restricted areas. Four slaughterhouses were used for pre-emptive culling, i.e. three in Apeldoorn and one in Epe, while two slaughterhouses were used to kill the purchased cloven-hoofed animals in the restricted areas, i.e. one in Apeldoorn and one in Twello.

Killing cloven-hoofed animals in slaughterhouses meant that large carcass parts could be deep-frozen, pending the availability of rendering capacity. A total of 13,000 tonnes of carcass material was deep-frozen. The carcasses were derived from farms where suppressive vaccination had been performed prior to pre-emptive culling. Another 4,000 tonnes of carcass material from purchase was also deep-frozen. The deep-frozen carcasses were stored temporarily in five cold-storage plants.

Animal flows

An overview of the various logistic plans developed for the removal of cloven-hoofed animals during the FMD campaign is given below. Each flow is described separately because of the differences between the flows from infected farms, farms with pre-emptive culling (with an extra difference between suppressive-vaccination farms and farms where no suppressive vaccination had been performed) and from purchase (i.e. killing due to welfare problems).

Infected farms

All cloven-hoofed animals on farms where infection was confirmed were slaughtered on the affected farm. The carcasses were loaded into rendering-plant trucks using grab-cranes. These trucks carried the carcasses to a rendering plant. At the rendering plant, the carcasses were processed into meat-and-bone meal (MBM) and tallow. These end-products were then taken to an incineration plant and incinerated, some after interim storage. Manure was taken to an incineration plant, some after interim storage. Slurry either remained on the farm for at least 80 days or was taken to an incineration plant (some after interim storage) or acidified to pH<5.0. Milk was taken to a rendering plant after acidification, rendered and eventually incinerated. Any feed that might have become contaminated was also removed and incinerated. In addition, any products and implements that might have become contaminated with FMD virus and could not be disinfected were also incinerated.

Farms where pre-emptive culling was performed

Two different situations existed on farms where pre-emptive culling took place, namely:

- farms where no suppressive vaccination was carried out prior to pre-emptive culling
- farms where the cloven-hoofed animals were vaccinated pending pre-emptive culling.

Farms where no suppressive vaccination was carried out prior to pre-emptive culling

On such farms, the same rules for the removal of cloven-hoofed animals from infected farms were applied. The same rules as for infected farms also applied to the removal of milk, feed, products and implements that might have become

contaminated with FMD virus and could not be disinfected. Once serological tests proved negative (samples were taken during the pre-emptive cull), manure either had to remain on the farm for 30 days or was acidified to pH<5.0.

Farms where suppressive vaccination was performed prior to pre-emptive culling

On these farms, vaccinated cloven-hoofed animals could be removed alive. However, this could only be done 14 or more days after these animals had been vaccinated. These cloven-hoofed animals were killed at central culling places in the restricted areas. The carcasses were then taken to a rendering plant, like those of the animals killed on farms. Using slaughterhouses as central culling places enabled carcass parts to be deep-frozen after killing. The deep-frozen carcass parts could then be taken to a rendering plant for destruction when rendering capacity became available. Manure, feed, products and implements that might have become contaminated with FMD virus and could not be disinfected were dealt with in the same way as on farms where pre-emptive culling was carried out without suppressive vaccination. Milk from these farms, however, was taken to a designated dairy factory in Zwolle (situated in the surveillance zone) and specially processed at that facility.

Purchase of cloven-hoofed animals by the State in order to alleviate animal welfare problems

Purchase refers to the buying and killing of cloven-hoofed animals from farms in restricted areas and on which welfare problems were found to be present. Welfare problems arose because farms could no longer remove cloven-hoofed animals due to the standstill measures applied to the restricted areas. However, farms on which pre-emptive culling was performed did not qualify for the purchase scheme. Initially, in cases where purchase was practised, cloven-hoofed animals were killed on the farms (also see above). For capacity reasons (both culling and rendering capacity), the cloven-hoofed animals were later removed from farms alive in the case of purchase. These animals were then killed in designated slaughterhouses within the restricted areas, after which carcass parts could be deep-frozen as described above. Only those animals on farms that really presented welfare problems were eligible for purchase. Welfare problems were assessed by veterinary practitioners. Standard forms were available to quantify the degree of the welfare problem. Random checks (in 10% of the cases) on the welfare assessments by veterinary practitioners were carried out by an official RVV veterinarian. To establish that the cloven-hoofed animals showed no signs of FMD, clinical examinations were conducted before the animals were removed.

To minimise purchase and thus killing and destruction of cloven-hoofed animals in the restricted areas, slaughter for the domestic market was made possible as soon as European Community (EC) regulations allowed this (1). In addition to these EC regulations, final screening of these farms had to be

completed before the cloven-hoofed animals were removed to slaughterhouses (1, 4). Meat from the slaughtered animals was marked with a national health mark. In areas where slaughter for the domestic market was possible, purchase for welfare reasons was not permitted. During the FMD outbreak, slaughter for the domestic market in the restricted areas took place in the slaughterhouses of Epe and Twello. During this period, a total of 14,053 fattening pigs were slaughtered, providing a rendering capacity savings of some 1,500 tonnes. However, this procedure failed in the case of veal calves because of market conditions. Normally up to 85% of veal is exported from the Netherlands. Demand for veal on the domestic market is insufficient to deal with an exceptional slaughter volume of veal calves. Purchase was officially stopped as soon as the slaughter of veal calves for the domestic market was permitted.

Carcass flow chart

Figure 1 shows the flows of the cloven-hoofed animals or carcasses described above.

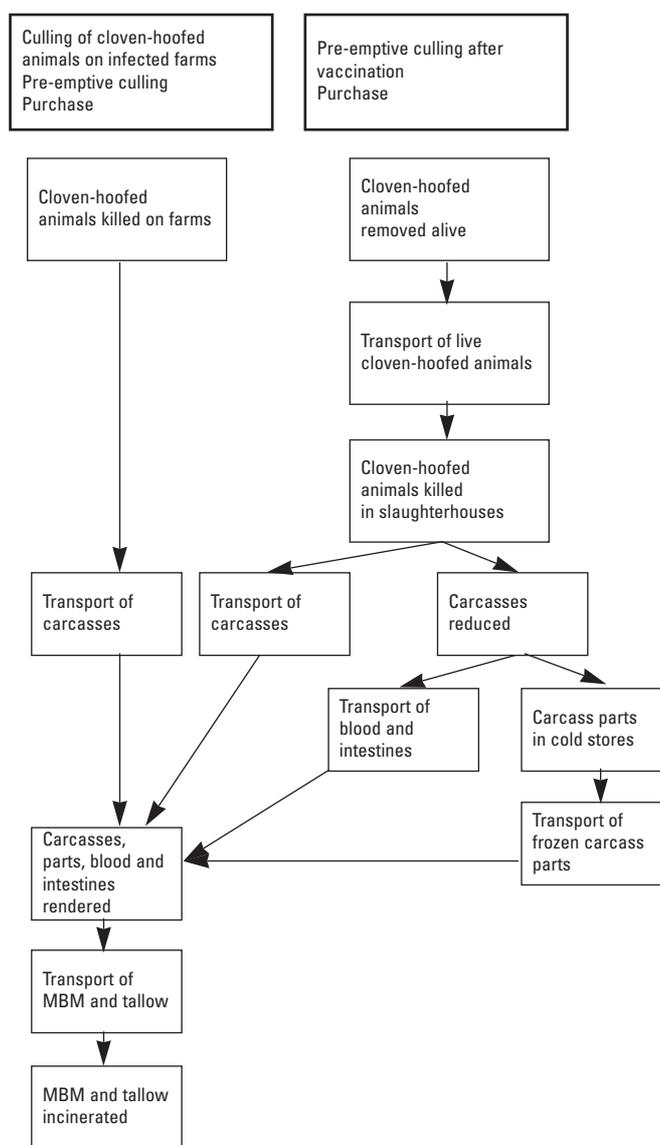
Carcasses

This section presents a detailed, step-by-step description of the culling of cloven-hoofed animals and the destruction of carcasses.

Culling on farms

Culls on farms were performed by culling teams, headed by an RVV veterinary co-ordinator. To guarantee a balanced audit trail, the veterinary co-ordinator checked before the cull whether the number of cloven-hoofed animals to be culled matched the number of animals valued earlier.

The culling technique used on farms was electrocution for pigs weighing over 25 kg. Both electrocution trailers and hand-held electrocution tongs were available. Pigs under 25 kg were killed by lethal injection. The injection fluid consisted of 250 mg embutramide, 50 mg mebezoniumiodide and 5 mg tetracainehydrochloride per millilitre. Adult cattle were first stunned by captive bolt, followed by a lethal injection as above. Manageable cattle were killed by administering a single lethal injection. Calves aged up to six to eight weeks were first stunned with electrocution tongs and then killed using the same lethal injection. Older calves were killed in the same way as adult cattle. Sheep and goats were stunned with electrocution tongs and then killed by injection. To kill the special cloven-hoofed animals (fallow deer, red deer, llamas, dromedaries, Scottish highlanders and a muntjak), an appeal was made to the veterinary practitioner of the farm in question and to the owner himself. They knew the reactions of these special cloven-hoofed animals best and also knew how to handle them. Wild and dangerous animals were killed with a rifle shot. The RVV veterinary co-ordinator on the farm was responsible for supervising animal welfare.



MBM: meat-and-bone meal

Fig. 1
Flows of rendering materials from cloven-hoofed animals during the foot and mouth disease outbreak in the Netherlands in 2001

The carcasses were dumped in a rendering-plant truck using a grab-crane. They were carried in fully closed, guaranteed leak-proof trucks amenable to thorough cleaning. The top layer was sprayed with disinfectant (citric acid 2%) before the rendering truck was closed. The truck was then sealed. To ensure that no rendering material was lost during transport, the seal number was identified on the accompanying form. A Ministry of Agriculture, Nature Management and Fisheries (LNV: Ministerie van Landbouw, Natuurbeheer en Visserij) official checked whether the seal was still in place on arrival of the truck at the rendering plant. To guarantee a balanced audit trail, the result of this check was also stated on the accompanying form.

Rendering plant

The laden rendering truck was weighed at the rendering plant. The empty rendering truck was weighed again once the transported material had been removed. These details were likewise stated on the accompanying form. The weighing note was attached to the accompanying form. The rendering process consisted of heat treatment (133°C) at a pressure of at least 3 bar for at least 20 min. The end-products of the rendering process, MBM and tallow, were stored and eventually incinerated. This process was performed in accordance with the EC regulations for handling specified risk material (SRM) (5, 6). This trail was checked by officials from the Ministry of Health, Welfare and Sport, the ministry responsible for supervising rendering plants in the Netherlands. The rendering material flows were secured by administrative checks on the weights stored and removed (weighing the laden and the empty vehicles at the rendering plant and at the incineration plants).

Incineration plant

The end-products of the rendering process, MBM and tallow, were incinerated at an incineration plant. The entire process, including verification is described above.

Removal of live animals from farms for culling

The removal of live cloven-hoofed animals, vaccinated 14 or more days earlier, was co-ordinated by an RVV official. Vehicles were rented by LNV and used for these activities only. The vehicles were fully cleaned and disinfected after each transport. Transport from a farm to a central culling place was possible on the basis of one-to-one transport only. All cloven-hoofed animals were counted before being moved. The number of animals counted was matched against the number valued earlier and these numbers had to correspond. The number of animals per transport was recorded on the accompanying form. Transports took place under seal and were accompanied by an LNV official. The seals were also referred to on the accompanying forms.

Slaughterhouse

On arrival of the truck at the central culling place, the seal was checked and the animals brought in were counted again. Both results were recorded on the accompanying form, thus securing a balanced audit trail. Carcasses were either deep-frozen or not, depending on the rendering capacity available. If sufficient rendering capacity was available, animals were killed by bleeding after stunning, and carcasses were transported to a rendering plant immediately. If insufficient rendering capacity was available, the carcasses were deep-frozen. After bleeding, a few limited dressing actions were performed, namely: the heart, lungs and the gastrointestinal parts were removed and the carcasses were quartered. The carcass parts were immediately coloured with methylene blue and then refrigerated in the slaughterhouse. The blood, heart, lungs and the gastrointestinal parts were taken to the rendering plant immediately. All

products leaving the slaughterhouse were weighed. This guaranteed that all animals killed had actually left the slaughterhouse for a rendering plant or a cold-storage plant.

Cold-storage plant

The carcass parts, wrapped in plastic wrapping and packed in big wooden crates, were stored in designated cold-storage plants (-18°C). To guarantee that all deep-frozen vaccinated FMD carcass parts and purchased FMD carcass parts actually reached the rendering plant, the cold-storage plants kept a balanced, kilogram-based storage and removal register. Trucks were weighed laden and empty on arrival at the cold-storage plants. Trucks were also weighed empty and laden when taking frozen carcass parts to a rendering plant. The vehicles were weighed again, laden and empty, on their arrival at a rendering plant. Each consignment that arrived at or left the cold-storage plants was supervised by an LNV official. In addition, all freezer cells containing vaccinated FMD carcass parts and purchased FMD carcass parts were sealed by LNV officials. Frozen carcass parts were always moved in sealed freezer trucks with an accompanying form.

Products and other items

This section describes the conditions in which products and other items were removed from farms where culls had been performed.

Manure

Apart from the difficulties encountered in providing sufficient culling and rendering capacity, manure also presented a major problem during the FMD campaign. Soon after the commencement of the campaign, large quantities of manure had to be disposed of. The following solutions were finally devised. Manure on infected farms was taken to an incineration plant in open, disinfected containers. After loading, the top layer of the manure was doused with citric acid 2%. Although citric acid is a weak acid and the buffering capacity of manure probably partly neutralises the effect of the acid, citric acid was chosen because lowering the pH is much more effective in inactivating the FMD virus than increasing the pH using sodium hydroxide 2%. The container was then sealed with two layers of plastic sheeting and netting. Transportation of such consignments took place under seal with an accompanying form. The form identified the seal and the checks performed on the seal at the incineration plant. Sealing and checking of seals were the responsibility of an LNV official. Manure was mixed with household refuse, thus ensuring a higher calorific value which would guarantee proper incineration.

Slurry was acidified to pH<5.0. This was carried out with nitric acid 38%. The acid had to be properly mixed with the slurry so mixing was conducted by a special tanker truck equipped with mixing arms. Checks on mixing activities and on the resultant acidity of the mixture were performed by an LNV official.

One of the most practical solutions adopted was to leave the manure or slurry on the farms so that any FMD virus present would decay. There was an 80-day waiting period for infected farms and a 30-day waiting period for farms where pre-emptive culling had been carried out and where the serum samples proved negative. The 'infected' or 'suspected' status of these farms was not lifted until these periods had passed.

All vehicles used to remove or process manure or slurry were subjected to stringent cleaning and disinfection protocols when entering and leaving the farms. Disinfection was carried out using citric acid 2%.

Milk

After being acidified with citric acid to pH<5.0, milk from infected farms and farms where pre-emptive culling had been performed was taken to a rendering plant and included in the destruction process. The milk was transported in closed and sealed tanker trucks. On the farm, an LNV official affixed a seal on the tanker truck and the milk was transported with an accompanying form. An LNV official checked the seal at the rendering plant. The outcome of this check was noted on the accompanying form. Trucks carrying the milk did so on a one-to-one transport basis. To ensure proper compensation, the tanker truck was weighed laden and empty at the rendering plant.

Milk from farms where cloven-hoofed animals had been vaccinated went to a designated dairy factory in Zwolle (in the surveillance zone) and was processed there in conformity with EC regulations (3). The milk underwent high temperature short time (HTST) treatment and was then heated again until a negative reaction to the peroxydase test was obtained. The end-product of these treatments, powdered milk, was then available for human consumption.

All vehicles carrying milk were subjected to a strict cleaning and disinfection protocol before entering and leaving the farms, rendering plants and dairy factory. Disinfection was carried out using citric acid 2%.

Feed

Feed was subjected to the same regulations as manure.

Implements and produce

Implements and produce (such as cheese from dairy farmers with on-farm production) from farms where culling had been undertaken, that might have become contaminated and could not be disinfected, were taken to an incineration plant and incinerated there. Transportation took place under seal with an accompanying form. The seal was affixed and checked by an LNV official. Trucks were subjected to a stringent cleaning and disinfection procedure when entering and leaving the farms and incineration plants. Disinfection was carried out using citric acid 2%.

Lessons learned

Animal disease control depends on the speed with which control measures can be taken and pre-emptive culling is one of these measures. Pre-emptive culling makes heavy demands on culling and rendering capacity.

Culling capacity

Suppressive vaccination was found to compensate for a lack of culling capacity. Pending pre-emptive culling, suppressive vaccination proved an effective means to control the further spread of the virus, without reducing the speed of counter measures.

An added advantage of suppressive vaccination is that cloven-hoofed animals can be moved alive to slaughterhouses (14 or more days after vaccination). Culling under these circumstances proves less of an emotional burden for the livestock farmers involved. In addition, the use of slaughterhouses as central culling places substantially increases available culling capacity.

Rendering capacity

The available rendering capacity only became a problem when large numbers of animals were killed in slaughterhouses. Solutions such as the burying or burning of carcasses are impossible to implement in the Netherlands for environmental reasons (the Netherlands has a high groundwater level and a high population density) and because of lack of social support. An effective solution to the rendering capacity problem was the temporary storage of carcass parts in cold-storage plants, which eliminated the second bottleneck.

Agreements and contracts

To be able to implement immediate and efficient control measures in the event of an outbreak, clear agreements must be reached in advance with all parties involved. This guarantees that everybody knows what is expected of them during an outbreak. This clarity is very important, particularly at the commencement of an outbreak because sufficient uncertainties already exist at that stage.

These agreements should be laid down in contracts. One of the essential items in such a contract is stating how both expert staff and all necessary resources can be scaled-up. To combat outbreaks effectively, sequential scaling-up should be provided for. The inability to scale-up may result in the authorities involved being overtaken by events and possibly losing control of the situation. Financially, too, it is far more attractive to make agreements on prices during a disease-free period than during the course of a disease outbreak. Contracts need to be concluded with parties such as those responsible for laboratories, rendering plants, slaughterhouses, cold-storage plants, incinerators, disinfection companies, suppliers of

equipment, employment agencies, owners of grab-cranes, shower trucks and livestock trucks, information technology companies and accommodation suppliers.

The validity of all the required (environmental) licences should also be checked in advance, in co-operation with relevant government agencies. These might be licences to extend the

production time of a rendering plant, licences for the temporary storage of frozen carcass parts, the temporary storage of MBM and for the incineration of manure, feed, implements and produce from suspected or infected farms. This issue may cause considerable and unnecessary delay during an outbreak. ■

Destruction des cadavres d'animaux : l'expérience acquise par les Pays-Bas à l'occasion du foyer de fièvre aphteuse survenu en 2001

P.F. de Klerk

Résumé

Durant l'épizootie de fièvre aphteuse survenue en 2001, le principal problème logistique rencontré aux Pays-Bas a été celui de l'insuffisance des capacités d'abattage et d'équarrissage. Pour résoudre ces deux difficultés, une « vaccination suppressive » a été pratiquée. Celle-ci a tout d'abord permis de freiner une éventuelle propagation du virus, les biongulés vaccinés ayant pu être abattus lorsque la capacité d'abattage était redevenue suffisante. Ces biongulés vaccinés ont en outre pu être transportés vivants, après l'écoulement d'un laps de temps d'au moins 14 jours après leur vaccination, vers des centres d'abattage. Dans ces abattoirs centralisés, il a été possible de congeler une partie des cadavres et de remédier ainsi au manque de capacité d'équarrissage. Les quartiers congelés ont été détruits par la suite, une fois la capacité d'équarrissage redevenue suffisante. Un sérieux audit rétrospectif, basé entre autres sur le contrôle du tonnage de viandes traité par l'abattoir, a été la garantie que tous les biongulés qui avaient été vaccinés, abattus et temporairement congelés, avaient finalement bien été détruits.

Mots-clés

Abattoirs – Audit – Cadavres – Capacité d'abattage – Capacité d'équarrissage – Destruction des cadavres – Entrepôts frigorifiques – Fièvre aphteuse – Pays-Bas – Vaccination. ■

Eliminación de cadáveres animales: experiencias en el caso de los Países Bajos después del brote de fiebre aftosa en 2001

P.F. de Klerk

Resumen

Los principales problemas logísticos hallados durante los brotes de fiebre aftosa en los Países Bajos en 2001, fueron la insuficiente capacidad de sacrificio de los biungulados en la explotación y la insuficiente capacidad de tratamiento final de

los cadáveres. La base de la solución a ambos problemas fue la vacunación supresora. En primer lugar, la posibilidad de dispersión del virus se ve frenada gracias a la vacunación. En segundo lugar, la vacunación hace posible que los biungulados de las explotaciones vacunadas pueden ser sacrificados en el momento en el que la capacidad de sacrificio y tratamiento final de los cadáveres es suficiente. Como mínimo 14 días después de la vacunación, los biungulados vacunados pueden ser transportados a un lugar centralizado para su sacrificio. El uso de mataderos como lugar centralizado para el sacrificio de biungulados vacunados, permite la congelación de trozos de cadáveres, hallándose así también solución a la insuficiente capacidad de tratamiento final de éstos, ya que los cadáveres congelados pueden ser destruidos cuando se dispone de la suficiente capacidad. Una exhaustiva auditoría, basada entre otros controles, en un control de la cantidad de carne tratada en el matadero (por kilos), es la garantía de que todos los biungulados vacunados, sacrificados y temporalmente congelados han sido eliminados.

Palabras clave

Almacenes frigoríficos – Auditoría – Cadáveres – Capacidad de sacrificio – Capacidad de tratamiento final de cadáveres – Fiebre aftosa – Mataderos – Países Bajos – Tratamiento final – Vacunación.



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