

Foot-and-mouth disease

- ▷ Foot-and-mouth disease (FMD) is caused by a virus.
- ▷ It affects mainly cloven hoofed animals such as cattle, pigs, sheep, goats, deer but even elephants, rats and hedgehogs can catch it.
- ▷ FMD is highly contagious and can be fatal in some cases.
- ▷ It is a notifiable disease, which means the government must be informed of any suspected case.

The virus

Foot-and-mouth disease virus (FMDV) is a member of the Picornaviridae family. FMDV has 7 serotypes: O and A (distributed globally), C, SAT-1, SAT-2 and SAT-3 (present in some southern African countries) and Asia-1 (present in Asia and Eastern Europe). By carrying out tests to identify the serotypes in outbreaks, scientists can monitor the spread of the disease, trace it back to the source and implement the correct control measures.

History

After World War II the disease was distributed globally. FMD is now endemic in areas of Asia, Africa and South America. Many countries, including New Zealand, Japan, North America and Australia have been declared disease-free. The largest outbreak in the UK to date occurred in 1967. The country was then free of the disease until 2001 when a Type O pan Asia strain infected 2,000 animals and led to the slaughter of around seven million sheep and cattle, which eventually stopped the disease from spreading further. However, the UK farming industry suffered as a result of the outbreak, with losses estimated at £8 billion. In 2007, two outbreaks were caused by a vaccine strain of FMDV, an O1 BFS67-like virus from a research site, which was isolated in

the 1967 outbreak. Strict movement controls, disinfection and livestock culling minimised the impact of the outbreaks.

Symptoms

FMD has an incubation period of 2-6 days. Symptoms vary depending on the host animal. Cows experience a rapidly declining fever, blisters on the mouth leading to drooling and blisters on the feet causing lameness. Milk production is reduced. Pigs may also become lame and show blisters, which can result in thimbling (loss of hooves). FMD can be fatal, especially in young livestock, but some animals are asymptomatic and most recover in 2-3 weeks. A high proportion of clinically recovered cattle are persistently infected for months or years.

Spread

FMDV is highly infectious and spreads rapidly. It can be spread by contact with infected animals and their pens, vehicles, clothes and skin, standing water and feed supplements that contain infected animal products. Cows can be infected by the semen of infected bulls. FMDV can also be carried long distances by the wind, which is thought to be one of the mechanisms involved in the spread of the 2001 outbreak.



MICROBIOLOGY AWARENESS CAMPAIGN

The Society for General Microbiology (SGM) Microbiology Awareness Campaign aims to highlight the important issues relating to microbiology. Through its many members, the SGM can offer impartial and expert information on all microbiological topics. Enquiries are welcome. Contact SGM, Marlborough House, Basingstoke Road, Spencers Wood, Reading RG7 1AG (t 0118 988 1843; f 0118 988 5656; e pa@sgm.ac.uk).

society for general
Microbiology



Threat to humans

FMD in humans is extremely rare. The virus has been isolated in at least 40 human infections. In these cases the disease was caught from infected animals, making FMD a zoonosis. The first recorded (but unproven) case was in 1695, and in 1834 a group of vets infected themselves as part of an experiment. *The Practitioner* reported a “remarkable outbreak” of FMD in 1884, in which 205 people were allegedly infected by milk. The last confirmed human case of FMD in the UK was in 1967.

Treatment

There is no cure for FMD. Animals can be vaccinated to protect them against the virus. Although vaccination is carried out in countries where the disease is endemic, it is problematic. There is no cross-protection from the different serotypes, which can differ genetically by 30%. Also, immunity offered by vaccination is only temporary, lasting months to years, because the virus continually evolves. Many countries that have been declared disease-free, including most of Europe, stopped vaccination in the early 1990s.

Management

FMD is an international cause for concern because of its infectivity and host range. Although rarely fatal, FMD can have drastic effects on the farming industry. Exports of livestock and animal products from infected countries are banned, which causes significant

economic and trade problems. Affected areas are quarantined to minimise this impact and infected animals are slaughtered for economic as well as welfare reasons. Surveillance and control zones are set up around areas where infection has occurred. Movement restrictions apply in these areas to prevent the spread of disease. Disinfectant is used on farming equipment, pens and vehicles to prevent carriage of the virus to new sites.

Further reading

Mahy, B.W.J. (2005). *Foot-and-mouth Disease Virus*. Springer.

Woods, A. (2004). *A Manufactured Plague: The History of Foot-and-mouth Disease in Britain*. Earthscan.

Rowlands, D.J. (editor) (2003). Foot-and-mouth Disease. *Virus Research*, vol 91.

www.defra.gov.uk/footandmouth/

MICROBIOLOGY AWARENESS CAMPAIGN

www.sgm.ac.uk

society for general
Microbiology