

Foot and Mouth Disease Virus (FMDv)

Foot and Mouth Disease (FMD) is a highly contagious viral disease affecting wild and domestic cloven-hoofed mammals. Of the domesticated species, cattle, pigs, sheep, goats and water buffalo are susceptible to FMD. Horse is refractory to the infection. FMD is not considered a human health or food safety risk.

Virology

FMD is the most contagious disease of mammals and has a great potential for causing severe economic loss; it is caused by a virus of the genus Aphthovirus, family Picornaviridae. There are seven serotypes of the non-enveloped FMD virus (FMDv), namely, O, A, C, SAT 1, SAT 2, SAT 3 and Asia 1. Infection with one serotype does not confer immunity against another. FMD cannot be differentiated clinically from other vesicular diseases, such as swine vesicular disease, vesicular stomatitis and vesicular exanthema. Laboratory diagnosis of any suspected case of a vesicular disease is therefore a matter of urgency.

Clinical Signs

An incubation of 1 to 5 days precedes clinical signs of disease in pigs. Lameness is often the first sign noticed. There is initial acute rise in rectal temperature; slobbering and chomping are common signs. Pregnant sows may abort or deliver stillborn, infected piglets.

Infection leads to the appearance of vesicles on the feet, in and around the oral cavity, and on the mammary glands of females. Vesicles can also occur at other sites, such as inside the nostrils and at pressure points on the limbs – especially in pigs. The severity of clinical signs varies with the strain of virus, the exposure dose, the age and breed of animal, the host species and the immunity of the animal. The signs can range from a mild or non apparent infection to one that is severe. Mortality from a multifocal myocarditis is most commonly seen in young animals.

Epidemiology of Transmission

Virus transmission occurs through respiratory aerosols and direct or indirect contact with infected animals and contaminated fomites, including through the consumption of infected animal products (meat, milk, offal). Aerosol transmission of FMDv over distances as great as 50 km is believed to occur under certain weather conditions. Pigs are exceptional disseminators of the virus and are sometimes referred to as ‘amplifier hosts’ for FMDv.

Prevention and Control

Many countries have successfully eradicated the disease, including Canada and the United States. In countries where FMDv has not been eradicated, vaccines are used for protection. Over 60 subtypes of the virus have been identified and new subtypes continue to develop. Many differ enough antigenically to require preparation of subtypes vaccines for their control. It has been impossible thus far to prepare a single vaccine that protects satisfactorily against all strains. Eradication is considered to be less costly than living with FMD.

In Canada and the United States, prevention of the disease depends on regulations that govern the importation of animals, animal products, semen, and embryos. There are also special regulations on both cooking and dumping of waste food to prevent spread of the virus.

Various disinfectants including Accelerated Hydrogen Peroxide (AHP), sodium hydroxide, sodium carbonate, citric acid and Virkon-S[®] (potassium peroxydisulfate and sodium chloride) are effective against FMDv. Iodophores, quaternary ammonium compounds, hypochlorite and phenols are reported to be less effective, especially in the presence of organic matter. The disinfectant concentration and time needed can differ with the surface type (e.g., porous vs nonporous surfaces) and other factors.

References

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