



Critical parameters and host preference of bluetongue virus among wild and domestic ruminants

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DESCRIPTION

Bluetongue Virus (BTV) is an insect-borne viral disease that causes a disease called "bluetongue" in livestock. Clinical signs include mucosal inflammation, edema, and bleeding of varying severity. Of the 26 BTV serotypes, 13 have been identified in Australia. Highly pathogenic strains associated with some overseas outbreaks are exotic to Australia. Until recently, bluetongue virus infections were distributed worldwide in a wide band from 35° south latitude to 40° to 50° north latitude. Bluetongue is a contagious and non-contagious vector-borne viral disease that affects wild and domestic ruminants, including sheep, goats, cattle, buffalo, deer, and most species of African antelope and camels. Bluetongue Virus (BTV) infection does not progress in the majority of animals but can cause fatal disease in infected sheep, deer, and some wild ruminants. Insect vectors from a few species of the genus *Culicoides* transmit bluetongue virus among susceptible ruminants infected by feeding viremic animals. The disease is caused by a virus that is transmitted by certain species of midges. The infectious *Culicoides* mosquito species has been found in Northern Ireland. Currently, the most likely route of entry of the disease into Northern Ireland is through the importation of infected animals or germplasm.

Viruses do not spread directly from animal to animal but are usually spread by insects that feed on infected animals. Bluetongue virus is the type species of the genus orbivirus in the family Reoviridae. Virions are unenveloped bilayer particles with an outer capsid surrounding a nucleus containing a segmented double-stranded RNA genome. The host is usually infected through mosquito saliva. The virus spreads locally, replicates in local lymph nodes causing viremia and systemic spread with viral replication in hematopoietic and endothelial cells, and causes endothelial injury, hemorrhage, vascular occlusion, tissue edema, and microvascular damage.

Bluetongue disease has been reported in several European

countries. Mosquitoes carry the bluetongue virus. One can get the virus by biting an infected animal. The virus is spread when infected mosquitoes bite uninfected animals. Once a mosquito ingests the BTV virus, it remains a lifelong carrier. Mosquito season in the UK is usually from April to November. Especially temperature and wind direction affect the speed and distance that mosquitoes can spread disease. Sheep are often the most affected species internationally and can exhibit a wide range of clinical manifestations. The disease is also recognized in cattle, but clinical manifestations are less frequent than in sheep. Vaccination is the best way to protect animals from the bluetongue virus. It can take up to 6 weeks for an animal to develop full immunity, as they have to be vaccinated twice, 3 weeks apart.

Clinical manifestations may vary between species and caution should be exercised. Symptoms are generally more severe in sheep, but cattle can also show signs of the disease. The course of bluetongue disease in sheep varies from acute to chronic, with mortality rate of 2%-90%. Hyperacute cases usually die within 7-9 days of infection as a result of severe pulmonary edema causing shortness of breath, runny nose, and death from suffocation. In the chronic case, sheep can die 3-5 weeks after infection, mainly from bacterial complications (especially pasteurellosis) and exhaustion. Animals with mild illnesses usually recover quickly and completely. Maximum production losses include mortality, prolonged recovery inefficiency, wool breakage, and reproductive loss. There is no specific treatment for blue-tongued animals other than rest, soft food, and proper care. Complications and secondary infections should be treated appropriately during the recovery period.

To minimize the risk of spreading the virus through management practices, avoid sharing needles between animals during injections and thoroughly clean and decontaminate other equipment between animals.