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Popular Article

# Blue tongue disease in Sheep

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## Introduction

Bluetongue is an insect-borne, viral disease primarily of sheep, occasionally goats and deer and, very rarely, cattle. The disease is non-contagious and is only transmitted by insect vectors. The disease is characterized by fever, widespread hemorrhages of the oral and nasal tissue, excessive salivation, and nasal discharge. Bluetongue (BT) is an Office International Epizooties (OIE) list A arthropod-borne viral disease

## Etiology

The disease is caused by a virus belonging to the family Reoviridae. Bluetongue virus is the type species of the genus Orbivirus in the family Reoviridae. The virion is a nonenveloped double-layered particle with an outer capsid that encloses a core containing a segmented double-stranded RNA genome.

## Epidemiology

The virus is present in most countries of Africa, the Middle East, India, China, the United States, and Mexico. Bluetongue virus infection, without associated clinical disease, is present in Southeast Asia, Papua New Guinea, northern South America and northern Australia. A strain of bluetongue virus was first identified in Australia in 1975 from trapped insects but despite its long-term presence, it has not caused any clinical disease.The distribution and intensity of infection in region of the continents is determined by climate, geography and altitude, as they effect the occurrence and activity of Culicoides vectors, and by presence of susceptible mammalian hosts.

## Host Range

Primarily a disease of sheep but other species such as goats, cattle, buffaloes, camels, antelopes and deer can be infected. Humans are not affected. Cattles are the major reservoir host for sheep.

## Mode of transmission

Vector-borne transmission through *Culicoides* spp is the primary way that BTV is transmitted. Virus concentrations in secretions and excretions are minimal, making direct, indirect, or aerosol transmission unlikely. Bluetongue virus has been found in the semen of infected bulls during the initial viremic period, and infection has been transmitted through bull semen to susceptible cows, but it is unlikely that this is a significant mechanism of transmission. Transplanted embryos from infected services are free of the virus and this is regarded as a minimal risk technique for obtaining offspring from cattle and sheep in infected areas

## Clinical signs

In sheep, BTV causes vascular endothelial damage, resulting in changes to capillary permeability and subsequent intravascular coagulation, leading to edema, congestion, hemorrhage, inflammation, and necrosis. The clinical signs in sheep are typical. After an incubation period of 4–6 days, a fever of 40.5°–42°C (105°–107.5°F) develops. Affected animals are listless and reluctant to move. Clinical signs in young lambs are more apparent, and the mortality rate can be high (up to 30%). Approximately 2 days after onset of fever, additional clinical signs may be evident, such as edema of the lips, nose, face, submandibular area, eyelids, and sometimes ears; congestion of mouth, nose, nasal cavities, conjunctiva, and coronary bands; and lameness and depression. A serous nasal discharge is common, later becoming mucopurulent.

## Post mortem findings.

Post mortem lesions include generalized edema, hyperemia and hemorrhage and necrosis of skeletal and cardiac muscles. There is a most distinctive hemorrhage at the base of the pulmonary artery. Animals with damage to esophageal or pharyngeal musculature may have lung consolidation due to aspiration pneumonia. Hyperemia and edema of the abomasal mucosa are some times accompanied by ecchymoses and ulceration. Microscopically there is thrombosis and widespread microvascular damage leading to myodegeneration and necrosis.

## Diagnosis.

Primary diagnosis can be made based on clinical signs, oral, nasal, ocular lesion along with persistent high temperature and enlarged lymph nodes. Confirmatory diagnosis is based on

pathognomy histopathological lesion at necropsy. Various techniques have been used to detect antibodies against BTV. These include agar gel immunodiffusion (AGID), hemagglutination-inhibition, complement fixation and ELISA, which are serogroup-specific and serum neutralization, which is serotype-specific. Although all these assays are available, only AGID and competitive-ELISA are recommended as prescribed tests for international trade in the OIE Manual of Standards for Diagnostic Tests and Vaccines.

## Prevention and control

1. **Reduction of infection through vector abatement**
2. **Vaccination**

## Reduction of infection through vector abatement

Attempts to control bluetongue through a reduction of infection consist of reducing the risk of exposure to infected Culicoides and reduction in Culicoides numbers. Neither are particularly effective. Reducing the risk of exposure is attempted by spraying cattle and sheep with repellents and insecticides and housing sheep at night. Biweekly application of permethrin was found not to be effective in preventing infection. During transmission periods avoidance of low, marshy areas or moving sheep to higher altitudes may reduce risk. Because of the preference of some Culicoides for cattle as a host, cattle have been run in close proximity to sheep to act as vector decoys. Local application of insecticides on animals and around animal holdings can be efficacious against *Culicoides* species There is a high mortality in Culicoides that fed on cattle that have been treated with a standard anthelmintic dose of ivermectin and also a larvicidal effect in manure passed for the next 28 d for Culicoides that breed in dung

## Vaccination

Vaccination will not prevent or eliminate infection but it is successful in keeping losses to a very low level provided immunity to all local strains of the virus is attained. Current vaccines are usually polyvalent attenuated virus vaccines and are in use in South Africa and Israel and available in other countries. These vaccines have been used in South Africa for more than 50 years and they are known to induce effective and long lasting immunity. Currently they are produced in cell culture and freeze dried.

## Treatment

Local irrigations with mild disinfectant solutions may afford some relief. Affected

sheep should be housed and protected from weather, particularly hot sun, and fluid and electrolyte therapy and treatment to control secondary infection may be desirable. (Radostits and Blood,1994)

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