

BLUETONGUE

AETIOLOGY

Classification of the causative agent

Virus family Reoviridae, genus *Orbivirus* with 20 recognised species in the genus. The bluetongue virus (BTV) species contain 24 recognised serotypes and are related to the viruses in the epizootic hemorrhagic disease (EHD) serogroup.

Resistance to physical and chemical action

Temperature: Inactivated by 50°C/3 hours; 60°C/15 minutes.
pH: Sensitive to pH <6.0 and >8.0.
Chemicals/Disinfectants: Inactivated by β -propiolactone; iodophores and phenolic compounds.
Survival: Very stable in the presence of protein (e.g. has survived for years in blood stored at 20°C).

EPIDEMIOLOGY

- Non-contagious by casual contact
- Some midges of the genus *Culicoides* (insect host) transmit BTV among susceptible ruminants; these insect hosts having become infected by feeding on viraemic animals (the vertebrate host)
 - replication period in the insect's salivary gland of 6–8 days
 - infected midges infective for life
- Midges are the only significant natural transmitters of BTV; thus distribution and prevalence of the disease is governed by ecological factors (i.e. high rainfall, temperature, humidity and soil characteristics)
 - in many parts of the world infection has a seasonal occurrence
- BTV does not establish persistent infections in ruminants thus survival of the agent in the environment is associated with insect factors
- Morbidity in sheep can reach 100% with mortality between 30 and 70% in more susceptible breeds; mortality in wild deer and antelopes can reach 90%
 - BTV serotype 8 in Europe saw higher numbers of cattle affected however mortality remained below 1%

Hosts

- BTV vertebrate hosts include domestic and wild ruminants; sheep, goats, cattle, buffaloes, deer, most species of African antelope and other Artiodactyla such as camels
 - the roll of non-ruminant species in the disease in the wild is not known
 - variation in sheep breed susceptibility
- Cattle, goats, dromedaries, wild ruminants: generally inapparent infection

Transmission

- Biological vectors: *Culicoides* spp.

Sources of virus

- Infected *Culicoides*
- Blood
- Semen

Occurrence

Globally the distribution of BTV is directly associated with the presence of competent vectors and their habitats (episystems). BTV activity can be found on all continents except Antarctica; though different serotypes and strains cause markedly variable disease.

DIAGNOSIS

Incubation period is usually 5–10 days. Subclinically infected cattle can become viraemic 4 days post-infection.

Clinical diagnosis

Disease outcome of infection ranges from inapparent, in the vast majority of infected animals, to fatal, in a proportion of infected sheep, goats, deer and some wild ruminants. As with many diseases, severity will depend on factors related to agent, host, and environment.

Acute form (sheep and some species of deer)

- Pyrexia up to 42°C, excessive salivation, depression, dyspnoea and panting
- Initially clear nasal discharge becomes mucopurulent and upon drying may form a crust around the nares
- Hyperaemia and congestion of the muzzle, lips, face, eyelids and ears; leading to oedema
- Ulceration and necrosis of the mucosae of the mouth
- Tongue may become hyperaemic and oedematous; later cyanotic and protrude from the mouth
- Extension of hyperaemia to coronary band of the hoof, the groin, axilla and perineum; lameness due to coronitis or pododermatitis and myositis
- Torticollis in severe cases
- Abortion or birth of malformed lambs
- Complications of pneumonia
- Emaciation
- Either death within 8–10 days or long recovery with alopecia, sterility and growth delay

Inapparent infection

- Frequent in cattle and other species for certain serotypes

Lesions

- Congestion, oedema, haemorrhages and ulcerations of digestive and respiratory mucosae (mouth, oesophagus, stomach, intestine, pituitary mucosa, tracheal mucosa)
- Severe bilateral bronchobulbar pneumonia (when complications occur); in fatal cases, lungs may show interalveolar hyperaemia, severe alveolar oedema and the bronchial tree may be filled with froth
- Thoracic cavity and pericardial sac may contain large quantities of plasma-like fluid; distinctive haemorrhages found at base of pulmonary artery
- Congestion of hoof laminae and coronary band
- Hypertrophy of lymph nodes and splenomegaly

The OIE will periodically update the OIE Technical Disease Cards.
Please send relevant new references and proposed modifications to the OIE Scientific and Technical Department (scientific.dept@oie.int). Last updated April 2013.