Bluetongue Disease Fact Sheet

1. Disease overview

Bluetongue disease is an **infectious, non-contagious, vector-borne viral** disease, caused by **bluetongue virus (BTV)**, that affects domestic and wild ruminants (commonly sheep, goats, cattle, deer, buffaloes, camels, and most African antelope species). In mild to severe cases, it consists of a systemic haemorrhagic viral fever, with a varying severity in clinical signs.

Bluetongue disease is a **WOAH-notifiable disease**.

→ BTV most reported serotypes in WAHIS in the past 2 years: BTV3, BTV8, BTV4

Bluetongue disease is listed in the **European Animal Health Law** under categories **C, D, E**.

2. Agent

Bluetongue virus is a **non-enveloped, double stranded RNA virus** that belongs to the *Orbivirus* genus of the *Reoviridae* family. It is one of the 22 species of virus in the *Orbivirus* genus, which also includes African Horse Sickness virus (AHSV), Epizootic Haemorrhagic Disease virus (EHDV), and Equine Encephalosis virus (EEV).

According to World Organisation for Animal Health (WOAH) there are at least **27 officially recognized BTV serotypes**, named BTV-1 to BTV-27.

BTV has an icosahedral structure with 3 protein layers, composed of 7 structural proteins (VP1-VP7), along with five non-structural proteins (NS1-NS5). The inner layer, composed of VP3 capsomers, encloses 10 dsRNA segments. The intermediate layer is composed of VP7, and the outer layer comprises two proteins: VP2 and VP5.

VP7 determines serogroup specificity - it expresses antigens common to all BTV strains and serotypes - and it is also used to detect anti-BTV antibodies in C-ELISAs. **VP2 determines serotype specificity**.

3. Geographical Distribution

According to WAHIS data, the agent was reported in the EU in the last 2 years.

For more detailed information and dynamic maps, visit the *Geographical Distribution* section of the **disease profile** (accessible via the button in the top right corner).

4. Animal hosts

4.1. Primary animal species affected

Sheep are considered the most susceptible species - especially fine-wool breeds, such as Merino and crosses, and mutton breeds.

Occasionally, BTV affects other species, such as goats, cattle, buffaloes, wild small ruminants (mouflons), camelids (such as camels, dromedaries, llamas and alpacas), cervids (red deer, fallow deer, white-tailed deer, black-tailed deer), and most African antelopes. However, these species show disease only after infection with very virulent viral strains.

4.2. Clinical Signs

Both the severity and length of clinical manifestations vary depending on host species and breed, viral serotype or strain, husbandry conditions and the surrounding environment.

BTV causes **widespread capillary damage**, which leads to oedema, congestion, haemorrhage, inflammation, intravascular coagulation and necrosis.

- **Respiratory signs:** Nasal discharge (firstly serous, becoming mucopurulent within days, often forming crusts around the nostrils and muzzle), pulmonary oedema, and second bacterial bronchopneumonia. Peracute cases can die after 7-9 days, due to severe respiratory signs that lead to asphyxiation.
- **Skin**: Hyperaemia observed in hair-free areas (groin, axila, and perineum). In chronic cases, there is wool breakage caused by an underlying dermatitis.
- **Gastrointestinal Tract**: Diarrhoea, sometimes bloody.
- **Gestation**: Infection during early gestation often results in abortion or congenital malformations such as hydranencephaly ("dummy calf syndrome").
- **Locomotion**: Reluctance to move, due to inflammation of the coronary band. Chronic cases may display lameness and torticollis, when there is skeletal muscle degeneration.
- **Depression**, recumbency, and death are common in severe cases. Some sheep exhibit sudden death due to cardiac necrosis, even during apparent recovery.

In cattle, goats, and African antelopes, infection is usually subclinical, acting as important amplifying reservoirs. However, when infected with a more virulent strain, these species can manifest clinical signs similar to the ones of mild or severe disease in sheep.

4.2.1. Incubation Period

The incubation period of bluetongue disease, defined as the interval between infection and the onset of clinical signs, mostly varies from 4 to 20 days (on average 4 to 7 days).

4.2.2. Morbidity and mortality

Morbidity rates approach 100% in susceptible populations. Case fatality typically ranges from 2% to 30%, but may reach as high as 70% in naïve or highly susceptible sheep breeds infected with virulent strains. Young lambs are particularly vulnerable, often exhibiting more severe clinical signs and experiencing elevated fatality rates of up to 30%. In wild deer and antelope species case fatality can be as high as 90%, according to the World Organisation for Animal Health (WOAH).

Peracute cases often result in death within 7 to 10 days, whereas chronic forms of the disease may lead to mortality within 3 to 5 weeks. In such chronic cases, death is primarily due to secondary infections and general exhaustion. Milder infections generally allow for a quick and full recovery. However, when convalescence is prolonged, significant production losses can occur, including wool breaks, reproductive failure, and growth retardation.

4.2.3. Zoonotic Potential

Human infection has not been reported.

5. Transmission

BTV is transmitted to vertebrate hosts through the bite of certain species of ***Culicoides*** **midges**.

→ *Culicoides* vectors have been reported in the EU in the past 2 years.

→ For more information on vector distribution, visit the *vector* section in the disease profile online.

BTV-25, BTV-26 and BTV-27, as well as several recently isolated, but yet to be classified, "atypical" strains, appear to be transmitted to susceptible vertebrate hosts vertically, horizontally and through indirect contact (e.g. reused needles), without the interference of biological vectors. However, the impact these routes have on the epidemiology of this disease remains unclear.

6. Diagnostic tests

WOAH-recommended tests for **agent detection** are Real-time RT-PCR, RT-PCR and classical virus isolation.

For **immune response detection**, the recommended tests are C-ELISA (serogroup specific), virus neutralization (serogroup specific), and agar gel immunodiffusion (AGID).

The following table presents data on the sensitivity and specificity of several diagnostic tests from studies deemed eligible according to EFSA's systematic literature review protocol:

Target	Test	Specificity	N studies	Sensitivity	N studies
Nucleic acid	Real-Time PCR (qualitative or quantitative)	98.475	2	99.525	2
Antibody	Agar gel immunodiffusion test (AGIDT)	99.34	5	-	0
Antibody	ELISA, Competitive ELISA (C-ELISA)	99.30	36	96.9	27
Antibody	Indirect ELISA (I-ELISA)	90.43	2	89.725	2
Antibody	Seroneutralisation test	100.00	1	100	1

7. Prevention and control

7.1. Vaccination

Both live attenuated and inactivated vaccines against Bluetongue virus (BTV) are approved for use in certain countries. According to the World Organisation for Animal Health (WOAH), vaccination is the **preferred control strategy in endemic regions**. However, effective immunization requires a

match between the circulating serotype and the vaccine strain, since immunity is serotype-specific and does not confer cross-protection, complicating control efforts.

→ In the EU, there are **inactivated (dead)** vaccines approved against serotypes 4 and 8.

7.2. Treatment

There is currently **no specific antiviral treatment** for BTV infection. Management is primarily **supportive** and should be taken on early, by providing rest, soft and palatable food and clean water, and implementing good husbandry practices. Secondary bacterial infections during the recovery period, such as Pasteurellosis, should be treated appropriately with antibiotic therapy.

Although treatment is symptomatic, prophylactic immunization - particularly of sheep in endemic areas - remains the most effective and practical control strategy against Bluetongue Disease.

The systematic literature review performed by EFSA identified papers that investigated the efficacy of 1 **pharmacological treatment** (MAF + antibody 6C2A.4.2) in sheep and 1 **insecticide treatment** (Permethrin) in cattle. For more information, visit the *Treatment* section of the disease profile.