

Bluetongue Virus in Sheep

Information for Veterinarians

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KEY POINTS

- Virus transmitted by biting midges, *Culicoides*
- Outbreaks typically observed in late summer to early fall
- Symptoms include fever, lethargy, oral/mucosal sores, coronitis, lameness and nasal discharge
- Can cause infertility in rams and ewes
- Treatment is primarily supportive
- Vector control is key to prevention, vaccine has limited efficacy.
- BTV is a **REPORTABLE** disease

What is Bluetongue Virus?

Bluetongue Virus, or BTV, is an Orbivirus. There are 26 known serotypes that infect ruminants including cattle, sheep, goats, wildlife (deer), and new world camelids. It is a non-contagious, vector-borne disease with *Culicoides* being the primary route of transmission. BTV used to be endemic primarily to subtropical regions but, with warming climates, its endemic range has spread and now includes much of Europe and the United States. Due to its clinical similarities to Foot and Mouth Disease, confirmed BTV cases are reportable. Disease in sheep often follows outbreaks and die-offs in deer. Epizootic hemorrhagic disease (EHD) virus is a related Orbivirus that commonly infects deer and causes similar disease signs, however, rarely causes disease in sheep.

BTV in Washington State and the Northwest

Recently, BTV outbreaks have become an almost annual occurrence in Washington state sheep flocks and white tail deer populations. BTV serotypes 10, 11 and 17 have been identified in

the region. Late summer to early fall is the peak season for BTV when the *Culicoides* vector is most active. Weather is a key predictor of outbreaks. Mild winters and increased spring rainfall typically increase *Culicoides* population densities thereby increasing risk of BTV outbreaks as was the case in WA during fall 2015.

Clinical Signs & Diagnosis

BTV replicates in mononuclear phagocytes and endothelial cells where it induces expression of inflammatory cytokines and subsequent apoptosis of infected cells. Subsequent changes in vascular permeability result in disseminated intravascular coagulation and tissue necrosis, causing inflammation, edema, congestion and hemorrhage of tissues supplied by the damaged capillaries. In naïve flocks, morbidity can reach over 75%, however mortality is usually less than 5%, depending on the serotype. Inapparent infection or mild clinical signs are most common in flocks previously infected with BTV. Clinical signs include:

- Fever (up to 106-108 °F)
- Lethargy/reluctance to move

- Clear nasal discharge becoming mucopurulent which dries forming crusts
- Oral ulcerations causing hypersalivation, difficulty chewing/swallowing
- Lameness or stiff gait due to myositis and coronitis
- Swollen muzzle, head and ears
- Swollen and cyanotic tongue (hence the virus's name, Bluetongue)
- BTV can impact fertility in both ewes and rams which may result in a prolonged breeding season due to rebreeding. Breeding soundness exams should be performed to confirm ram fertility. Affected ewes can abort or may deliver lambs that fail to thrive or with birth defects including porencephaly and cerebral necrosis.
- Death may occur in severe cases or prolonged recovery with loss of wool

While BTV is usually suspected based on clinical signs, diagnosis should be confirmed by PCR testing for virus (plasma or tissues) or ELISA on serum. Contact WADDL for details on testing. Differential diagnoses for BTV in sheep include Foot and Mouth Disease, Contagious Ecthyma, and Sheep Pox. **Confirmed BTV cases are reportable to the state veterinarian.**

Washington State Veterinarian's Office: (360) 902-1878

Washington Animal Disease Diagnostic Laboratory: (509) 335-9696, waddl@vetmed.wsu.edu

Treatment

Treatment for BTV is supportive and will depend on the presenting signs:



PC: Sarah Maki-Smith, 2018

- Provide a comfortable, low stress environment for affected sheep, minimize movement and handling
- Soft feed and easy access to water to encourage eating and drinking
- Flunixin meglumine* (extra-label use) can reduce fever, inflammation and discomfort
- Oral drench with electrolytes if severe dehydration present
- Unless secondary bacterial infection or pneumonia is suspected, antibiotics* are not indicated

*See <http://www.farad.org/vetgram/sheep.asp> for a list of FDA approved drugs for sheep. If not on this list, use is extra-label and requires a valid VCPR and veterinarian's label as per AMDUCA [Subpart B Section 530.12](#)

Prevention

Vector control is key to reducing BTV transmission to flocks. Most important is to minimize standing water in areas sheep are kept as those areas are where *Culicoides* breed. Peak vector activity is dusk and dawn so keeping sheep indoors or away from marshy areas at those time can reduce risk of infection. Use of insecticide sprays (0.5% permethrin) can help repel midges but should be applied weekly. Spray should be applied to the belly and legs and back as they are the most common feeding sites. Higher concentration, pour on pyrethrins are more convenient but don't adequately repel midges from the belly and legs. Currently there is one BTV vaccine licensed for use in the United States from Colorado Serum Company. Vaccination is variably effective in prevention of BTV because the predominant serotype can vary by year and geographic region. There is limited cross-protection between the vaccine (BTV-10) and the prevalent serotypes in the region (BTV-10, 11, 17). If used, vaccination should occur 1 month before the expected occurrence of the disease (mid to late summer). This allows time for immunity to develop. Anestrus in ewes

may occur in the 3 weeks following vaccination. Birth defects and abortion can occur if pregnant ewes are vaccinated.

Economic Importance

Infection with BTV can result in losses to individual producers through treatment costs, infertility in rams and ewes as well as reduced production and quality of wool and meat. A severe outbreak can have impacts on local, national and international trade as BTV is an OIE reportable disease.

Resources/References:

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