Bluetongue

Etiology
Bluetongue is an insect-borne disease of ruminants, resulting from infection by the bluetongue virus, a member of the genus Orbivirus and family Reoviridae. Affected animals may have erosions and ulcerations on mucous membranes, and the face and tongue may become swollen. Bluetongue viruses are closely related to the viruses in the epizootic hemorrhagic disease (EHD) serogroup.

Species affected
Bluetongue virus infects many domesticated and wild ruminants including sheep, goats, cattle, buffalo, deer, antelope, bighorn sheep and North American elk. Severe disease can also occur in some wild ruminants including white-tailed deer, pronghorn and desert bighorn sheep.

Geographic distribution
The bluetongue virus has been found in Africa, parts of Asia, Australia, Europe, the Middle East, North and South America, and the South Pacific. In the United States, the distribution of the vectors limits infection to the southern and western states.

Transmission
Bluetongue virus is primarily transmitted by vectors and fomites. Biting midges in the genus Culicoides are the principal vectors. Ticks or sheep keds can be mechanical vectors but are probably of minor importance. Bluetongue is not a contagious disease; however, the virus can be spread mechanically (fomite) on surgical equipment and needles. Bluetongue virus can be found in semen, and venereal transmission (direct contact) from bulls is possible.

Incubation period
In sheep, the incubation period is usually 5 to 10 days. Cattle can become viremic starting at 4 days post–infection, but rarely develop symptoms. Animals are usually viremic to the insect vector for several weeks.

Clinical signs
Infections are clinically inapparent to severe.

Sheep: Fever, excessive salivation, depression, dyspnea and panting. The face and tongue may be swollen, and the coronary bands are often hyperemic. Lameness is common, and animals may slough their hooves. Ewes may abort or give birth to “dummy” lambs.

Cattle: Mostly subclinical with rare signs. Mild hyperemia, vesicles or ulcers in the mouth; hyperemia around the coronary band; hyperesthesia; or a vesicular and ulcerative dermatitis; thick cervical skin folds. Temporary sterility may be seen in bulls. Infected cows deliver calves with hydranencephaly or cerebral cysts. Cattle that have clinically apparent disease may develop foot rot weeks after infection.

Goats: Similar to cattle.

Wild ruminants: Inapparent to severe disease can occur in some species. Pronghorn antelope and whitetail deer: hemorrhages and sudden death.

Zoonotic potential
Bluetongue is not a significant threat to human health.

Diagnosis
Bluetongue should be suspected when typical clinical signs are seen during seasons when vectors are active. Laboratory: Polymerase chain reaction (PCR) techniques are widely used to identify the bluetongue virus in clinical samples. These techniques allow for rapid diagnosis. Other tests, such as virus isolation and serology can also be performed. Blood and serum, spleen, lung, and brain tissues, if available, should all be submitted.

Differentials: Foot-and-mouth disease, vesicular stomatitis, pest des petits ruminants, plant photosensitization, malignant catarrhal fever, bovine virus diarrhea, infectious bovine rhinotracheitis, parainfluenza-3 infection, contagious ecthyma (contagious pustular dermatitis), sheep pox, foot rot and Oestrus ovis infection. In cattle and deer, epizootic hemorrhagic disease can also result in similar symptoms.

Prevention and control
Bluetongue is transmitted by insect vectors and is not contagious by casual contact. Insect control is important in limiting the spread of the disease; synthetic pyrethroids or organophosphates are effective against Culicoides. Moving animals into barns in the evening can also reduce the risk of infection. Although the bluetongue virus does not infect equids, horses and stable horses should be considered in any control scheme, as Culicoides can feed on horses, and manure piles are ideal breeding sites for these vectors.

Notification of authorities
Bluetongue is a reportable disease in many states and clinically compatible with some exotic animal diseases. State authorities should be consulted for more specific information.

Federal: Area Veterinarian-in-Charge (AVIC)  
http://www.aphis.usda.gov/vs/area_offices.htm

State Animal Health Officials  

For more information
• Center for Food Security and Public Health, Iowa State University  
http://www.cfsph.iastate.edu/DiseaseInfo/

• The Merck Veterinary Manual, Bluetongue, 2006  

• World Organization for Animal Health (OIE)  
http://www.oie.int/eng/normes/mmanual/A_00032.htm

This information was developed by staff veterinarians at the CFSPH for use as training materials for the USDA APHIS National Veterinary Accreditation Program.