



## BOVINE VIRAL DIARRHOEA and BORDER DISEASE VIRUS INFECTIONS (BVDV, BDV)

ANIMAL GROUP AFFECTED	TRANSMISSION	CLINICAL SIGNS	FATAL DISEASE ?	TREATMENT	PREVENTION & CONTROL
Cervidae Giraffidae Antilocapridae Bovidae Camelidae Suidae	Virus shed in secretions, aborted fetuses, foetal membranes, uterocervical fluids, mechanical, vectors	Abortion, foetal malformations, stillbirth, weakened neonates, diarrhoea, haemorrhagic syndrome; hairy shaker (BDV)	Rare (haemorrhagic syndrome; mucosal disease), mostly subclinical		<i>In houses</i>  <i>in zoos</i> Separation of wild animals from livestock, quarantine; vaccination against BVDV

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<b>Susceptible animal groups</b> Serologic surveys and in some cases also virus isolation in free-ranging and captive ungulates demonstrated infection with BVDV or related pestiviruses in more than 50 species in North America, Africa, Australia and Europe.	
<b>Causative organism</b> The Bovine viral diarrhoea virus (BVDV) is a positive-sense, single-stranded RNA virus. The virions are spherical structures 50-60 nm in diameter. Infectivity of BVDV is lost at elevated temperatures and by treatment with detergents and lipid solvents. The virus is able to withstand a relatively broad pH range. BVDV and Border disease virus (BDV) exist in two biotypes: noncytopathic (ncp) and cytopathic (cp) for cultured cells. Most isolates are ncp, but cp viruses are recovered from animals with a specific BVDV-related affliction called mucosal disease.	
<b>Zoonotic potential</b> None.	
<b>Distribution</b> Cervidae, Giraffidae, Antilocapridae, Bovidae, Camelidae, Suidae.	
<b>Transmission</b> The principal reservoirs of BVDV and BDV are persistently infected (PI) cattle and sheep by virtue of high titer of virus shed in their secretions. Until now it is not known whether persistent infections occur in wild ungulates. Transmission of BVDV/BDV by acutely infected animals is not as efficient. Virus is present in aborted fetuses, foetal membranes, and uterocervical fluids. Transmission by mechanical and insect vectors has been reported. The role of pestiviruses in wild ungulate populations and the interactions between wild ungulates and domestic livestock are still not well understood. Suspected sources of the virus from wild animals include direct contact with infected livestock, shared feed and watering areas, or the presence of pestivirus-infected individuals within the populations. However, contact with livestock is not always necessary.	
<b>Incubation period</b> 2-14 days.	
<b>Clinical symptoms</b> The primary clinical signs are haemorrhagic mucosal inflammation and general physical impairment. Some isolates may cause the haemorrhagic syndrome. For acute infections clinical symptoms may be mild. Mucosal disease is inevitably fatal. Transplacental infection can lead to abortion, foetal malformations and development of persistently viremic ungulates depending on the state of development of the fetus and the biotype (cytopathogenic or noncytopathogenic) of the virus.	



<b>Post mortem findings</b> Lesions included erosion and ulceration of the oral mucosa, haemorrhagic enteritis and general physical impairment. Pyrexia, anorexia, salivation, and nasal discharge have been described; some animals with MD had skin lesions and may be lame due to interdigital ulceration and inflammation of coronary bands.
<b>Diagnosis</b> Antibodies: ELISA, NT; Virus: FA, IFA, RT-PCR.
<b>Material required for laboratory analysis</b> Virus should be isolated from buffy-coat cells or nasal secretions from acutely infected or suspected PI animals. Samples of thymus, spleen, lung, liver, mesenteric lymph nodes, tonsils, intestines, and kidney should be collected at necropsy for virus culture or PCR. Viral antigens and nucleic acids can be detected in acetone-fixed frozen tissue sections or impression smears of respiratory epithelium by different techniques.
<b>OIE Reference Laboratories</b> <ul style="list-style-type: none"><li>• <b>Dr D. Deregt (1)</b> Canadian Food Inspection Agency, Animal Diseases Research Institute P.O. Box 640, Lethbridge, Alberta T1J 3Z4 CANADA Tel: (1.403) 382.55.00 Fax: (1.403) 381.12.02 Email: <a href="mailto:deregt@inspection.gc.ca">deregt@inspection.gc.ca</a></li><li>• <b>Dr T.W. Drew</b> Head of Virology Department, VLA Weybridge Woodham Lane, New Haw, Addlestone, Surrey KT15 3NB UNITED KINGDOM Tel: (44.1932) 35.76.37 Fax: (44.1932) 35.72.39 Email: <a href="mailto:t.w.drew@vla.defra.gsi.gov.uk">t.w.drew@vla.defra.gsi.gov.uk</a></li><li>• <b>Dr Peter Kirkland</b> Elizabeth Macarthur Agriculture Institute (EMAI), Virology Laboratory PMB 8, Camden NSW 2570 AUSTRALIA Tel: (61-2) 46.40.63.31 Fax: (61-2) 46.40.64.29 Email: <a href="mailto:peter.kirkland@dpi.nsw.gov.au">peter.kirkland@dpi.nsw.gov.au</a></li></ul>
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<b>Treatment</b>
<b>Prevention and control in zoos</b> Control of BVD and BD in captive animals requires separation of wild animals from livestock and avoiding contact with contaminated biologicals. New arrivals should be quarantined. Where quarantine and separation from livestock are not feasible, and there is concern about BVDV infection, animals may be vaccinated and boosted with inactivated BVDV vaccines to prevent severe disease due to acute infection. Managers should be cognizant that vaccination has not been shown to protect against disease as well as foetal infections if dams are exposed to antigenically very different pestiviruses. Thus, there is a potential for production of PIs.
<b>Suggested disinfectant for housing facilities</b>
<b>Notification</b>
<b>Guarantees required under EU Legislation</b>
<b>Guarantees required by EAZA Zoos</b>
<b>Measures required under the Animal Disease Surveillance Plan</b>
<b>Measures required for introducing animals from non-approved sources</b>
<b>Measures to be taken in case of disease outbreak or positive laboratory findings</b>

**Conditions for restoring disease-free status after an outbreak****Contacts for further information**

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