

Cache Valley Virus – A Cause of Birth Defects in Ontario Lambs

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During the latter half of December 2015 and the start of 2016, the Animal Health Laboratory (AHL) received several submissions of stillborn and aborted lambs with unusual and severe birth defects. Other similar cases were also reported to OVC and OMAFRA veterinarians. The most likely cause of these birth defects was Cache Valley virus (CVV). Blood and tissue samples from fetuses, as well as blood samples from ewes, were tested for the virus and/or antibodies to CVV. On January 14, 2016, test results came back positive for CVV. CVV was previously diagnosed in Ontario flocks in 2011 and 2012.

CVV is a mosquito-borne virus. It is transmitted to sheep by infected mosquitos that previously fed on infected white tail deer, or that are offspring of infected mosquitos. Late summer and early autumn are the months when the highest amount of virus is present in the mosquito population. CVV is considered endemic in most parts of the United States, Mexico and Canada and infects a wide range of domestic and wild animals, as well as humans. Clinical disease, in the form of birth of deformed lambs, is most often reported in sheep. The virus is spread by several species of mosquitos. The Schmallenberg virus that has affected ruminants in many European countries also belongs to the same family of viruses.

Lambs and non-pregnant sheep infected with CVV show no signs of disease. However, if infection occurs during the first trimester of pregnancy (up to 48 days of gestation), the virus may cross the placenta and cause damage to developing fetuses. If infection occurs during the first 28 days of gestation, the embryos usually die and are resorbed. Infection between 28 and 48 days of gestation usually result in fetal malformation. Usually these lambs are born at term, stillborn or occasionally alive, but may also be aborted. These lambs have



Figure 2: Lamb born with flexed joints, curvature of the spine and poorly developed musculature.

obvious malformations of the legs, spine and brain. Malformations include underdeveloped/absent brain tissue and musculature, fluid accumulation around the brain, permanent flexing of joints, and curvature of the spine (Figures 1 and 2). It is not unusual for not all fetuses in the same litter to be affected, i.e. a normal lamb may be born co-twin to a deformed lamb. Infection after day 48 of gestation causes

no harm to the fetuses. Most producers report that deformed lambs are born in late December and early January – reflecting that the infection occurred approximately 3 to 4 months earlier (August to October) when ewes were in early gestation. Lambs born after this are unaffected because mosquito populations were decreased or killed by cold weather in late October and November. Goat fetuses may also be affected by CVV but to-date, no affected goat kids have been reported in Ontario.



Figure 1: Cross section of lamb skull showing collapse of malformed brain tissue and fluid accumulation.

Diagnosing CVV as the cause of lamb malformations or pregnancy loss is difficult because the infection occurs months before the lambs are born. If CVV is suspected, have your veterinarian submit samples (fetuses, placenta, blood from ewes) to the Animal Health Laboratory in Guelph or Kemptville. As the cause of a disease outbreak (i.e. abortion, birth defect) may change from year to year, it is important that the cause be confirmed. Animals that have been exposed to CVV may have lifelong immunity which should be protective to subsequent lambings. However, infection with CVV does not protect against infection from other viruses in the same family. A 2011 study

found that the prevalence of CVV in Ontario sheep flocks (based on antibody titres) was widespread. Research into the seroprevalence of CVV in the Canadian sheep flock is ongoing.

CVV is a mosquito-borne zoonosis, which means that people can also be infected through bites from infected mosquitos (the infection is not spread through contact between sheep and people). Infection usually is asymptomatic or causes a mild fever. More severe neurological signs are rare but have been reported. Antibodies to CVV were identified in 5 to 16% of West Nile suspect cases from Manitoba and Saskatchewan in a 2009 report. Disease prevention is aimed at reducing exposure to mosquito bites by eliminating mosquito breeding sites, wearing protective clothing and using insect repellants.

It is unclear as to why there has been an increase in CVV cases this year given the high prevalence of antibodies (exposure) in the Ontario sheep population. A new strain of CVV or the unusually warm autumn of 2015 allowing for increases in mosquito populations, may be reasons for the greater number of cases.

There are no vaccines or treatments available to protect livestock against CVV. Preventive measures such as using insect repellants on breeding females during the mosquito season may help decrease fetal infections, but they are often difficult to implement. Keeping sheep away from cedar bushes and from wet areas during the breeding season may help to reduce exposure to mosquitos. The study performed in 2011 showed that sheep housed in a dry lot during the autumn were more likely to be infected. This may be because of near-by breeding areas for mosquitos and the inability for sheep to move away (e.g. upwind or into shelter) when being bitten. Work with your flock veterinarian on how best to reduce the risk of fetal losses due to CVV infection.

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