Managing the Risk of Malignant Catarrhal Fever (MCF) from Sheep to Bison

Prepared by the Ontario Animal Health Network

Malignant Catarrhal Fever (MCF), caused by ovine herpesvirus-2, is a dramatic (and often fatal) but sporadic disease in bison. Cases are often severe and of very short duration prior to death. Clinical signs may include fever, depression, discharge from the eyes and nose, cloudy/ulcerated eye(s), ulcers in the mouth causing salivation, and diarrhea. Rarely, a bison may be chronically ill for months before death. Cattle, deer and moose are also susceptible to MCF.

Most sheep are carriers of ovine herpesvirus-2 (OHV-2), however, the virus does not cause clinical disease in sheep (i.e. sheep do not show signs of illness and are otherwise healthy). Lambs become infected from adult sheep at approximately 2 months of age and begin shedding the virus at 5 to 9 months of age. The virus is shed intermittently for short periods of time, usually lasting less than 24 hours. OHV-2 is mainly transmitted by contact with nasal and eye secretions but the virus can also become aerosolized and travel by air. MCF has been documented to occur up to 5 kilometres from large sheep feedlots. MCF can occur at any time of the year but cases are more prevalent in the fall, which coincides with lambs being the correct age for viral shedding.

Year	Number of Confirmed MCF Cases* in Ontario		
	Bison	Cattle	Pigs
2011	0	1	0
2012	0	4	3
2013	0	1	0
2014	0	0	0
2015	0	1	0
2016	1^	2	0
2017	1	2	0
2018	1	1	0
2019	0	3	0
2020	1	1	0
Total	**4**	**16**	**3**

The Animal Health Laboratory (University of Guelph), periodically diagnoses MCF in bison, cattle and on rare occasions pigs, with most cases occurring in the fall and winter (Table 1).

*A case may have more than one animal affected.
^Ontario case tested directly at Prairie Diagnostic Services Inc (Saskatchewan).

It is important to determine the cause of any bison mortality on-farm. Contact your herd veterinarian to perform a postmortem examination and collect samples for testing to rule-in MCF and rule-out other possibilities such as bacterial infection, respiratory disease, or bovine viral diarrhea virus. Results can be used to implement management changes as necessary. Testing to detect OHV-2 can be performed on blood, liver, kidney, or brain tissue. The test of choice for clinical diagnosis is PCR (polymerase chain reaction) to detect viral DNA from OHV-2. There is no treatment for MCF, nor is there a vaccine.

Occasional MCF problems do occur in bison and it is important for both bison and sheep producers to understand the risk and manage accordingly. Risk factors include:

- Viral shedding from sheep – Adult sheep shed the virus during times of stress, such as lambing. Young lambs (weaning up to 10-11 months of age) are commonly the greatest source of viral shedding.

- Close contact between sheep and bison – Increasing the distance between sheep and bison reduces the risk of viral transmission. However, there is still no definitive science on what is considered a minimum safe distance.1 The risk of MCF depends on a number of factors besides distance and the age of sheep; flock size, climate and wind also play a role in disease transmission.

- Stressors to bison - Poor nutrition, illness, overcrowding, and handling can result in bison being more susceptible to infection with OHV-2.

- Workers and equipment shared between farms increases the risk of OHV-2 being carried between farms and infecting bison.

- Bison attending a salesbarn/livestock auction where sheep have been housed (within 1 month) or are housed at the same time as bison, is a high risk practice and should be avoided. In addition, bison should not be transported in vehicles that have recently carried sheep. Trucks/trailers should be cleaned and disinfected between uses.

In Canada where bison or farmed deer are reared, there have been tensions regarding the risk of OHV-2 being transmitted to susceptible species. Below are comments from Dr. Lynn Tait, OC Flock Management Inc in Alberta on approaches to managing this risk to bison (reproduced with her permission):

Farmed bison are fairly common here in Alberta as well as sheep, and I would take the following approach to coexistence and good neighbourly relations.

1. *Assume that ALL sheep can be non-clinical carriers of MCF.*
2. *Sheep shed the virus mainly during periods of stress, such as lambing and weaning.*
3. *MCF does NOT survive well in the environment (reports from hours to a couple of days under perfect conditions). Warm moist conditions are best for survival.*
4. *Bison are EXTREMELY susceptible to MCF, followed by elk and then deer species.*
5. *Bison are a dead-end host and MCF cannot transmit from bison to bison. Multiple deaths are the result of multiple contacts with the virus from the original source.*
6. *The bison get infected by direct contact with the virus, not generally by a vector like insects.*
7. *People can carry the virus on clothing, equipment and trailers and should practice good sanitation and biosecurity if involved in both species.*

If they are going to be neighbours, I would suggest that they graze mature sheep without lambs at foot and pay close attention to drainage and water movement through the properties. Bison should not be downhill in wet conditions or downstream of sheep to prevent any virus moving in the water to the bison. Bison should never be in close proximity to lambing or sheep gathering yards. There should be no direct contact like pasture fencelines and at least a 10-foot (3 meters) buffer zone on a shared fenceline. We have a lot of wildlife movement here and this does not seem to present an increased risk. I personally had sheep and bison on adjoining properties for many years without incident following the above recommendations as well as limiting bison contact with people and equipment involved in the sheep operation, especially during lambing.

Open discussion between neighbors and with their veterinarians to develop low-risk management and biosecurity plans will go a long way to preventing problems in the future, especially in more densely populated areas.

For more information on MCF, please visit the following websites:
Malignant Catarrhal Fever
https://publications.saskatchewan.ca/#/products/75815

1 Wilkens W. Malignant catarrhal fever.
Saskatchewan Ministry of Agriculture.
https://www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/agribusiness-farmers-and-ranchers/livestock/animal-health-and-welfare/malignant-catarrhal-fever

Merck Veterinary Manual
https://www.merckvetmanual.com/generalized-conditions/malignant-catarrhal-fever/overview-of-malignant-catarrhal-fever