

Determining the source of the *Psoroptes* outbreak in British Columbian bighorn sheep

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ABSTRACT: *Psoroptes* mites have been documented in American bighorn sheep (*Ovis canadensis*) populations throughout the 19th and 20th centuries however they were not reported in Canadian populations until 2011. Determining the source of the BC outbreak is necessary to understand the risk to other naïve populations and of re-exposure following disease eradication efforts. We hypothesized that rabbits known to be infested in the area were the source of infestation in the Canadian herd. *Psoroptes* mites recovered from bighorn sheep in British Columbia and northern Washington were compared to those found on pet rabbits and on historically infested bighorn sheep in Nevada, Oregon and Idaho using morphologic and molecular methods. Measurement of outer opisthosomal setae lengths of mature male mites and sequencing of mitochondrial genes Cytochrome B and Cytochrome C oxidase subunit I was performed to compare the relatedness of mites collected from these different hosts. *Psoroptes* mites acquired from BC and northern Washington bighorn sheep were more morphologically and genetically similar to those collected from rabbits than to those of bighorn origin collected south of Washington state. This is the first report of *Psoroptes* mites matching the rabbit ecotype (previously called *P. cuniculi*) parasitizing bighorn sheep in a natural setting. This information suggests that the *Psoroptes* introduction into Canadian bighorn populations was through a disease spillover event from rabbits rather than from spread of the parasite through bighorn movements. *Psoroptes* susceptible hosts such as rabbits and horses should be considered when managing *Psoroptes* in bighorn sheep.

Biennial Symposium of Northern Wild Sheep and Goat Council 22:32; 2020

KEY WORDS: Bighorn sheep, *Oryctolagus cuniculus*, *Ovis canadensis*, *Psoroptes*, *Psoroptes cuniculi*, *Psoroptes ovis*, rabbit
