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Source: Journal of Wildlife Diseases, 33(3) : 664-665

Published By: Wildlife Disease Association

URL: <https://doi.org/10.7589/0090-3558-33.3.664>

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## Contact Transmission of Psoroptic Mange from Bighorn to Stone Sheep

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**ABSTRACT:** *Psoroptes* sp. mites and tan crusty lesions were detected in the ears of a captive Stone sheep (*Ovis dalli stonei*) in April 1996, after contact with infected captive Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*). *Psoroptes* spp. have not been detected in free-ranging ungulates in Canada or Alaska (USA). This is the first report of *Psoroptes* sp. in Stone sheep, indicating their susceptibility to infection.

**Key words:** *Psoroptes*, scabies, Stone sheep, *Ovis dalli stonei*, external parasites, bighorn sheep, *Ovis canadensis*.

Three Stone sheep (*Ovis dalli stonei*) lambs, two males and one female, approximately 6 mo old, were obtained from the Assiniboine Park Zoo, Winnipeg, Manitoba, Canada, on 21 November 1995. The sheep were maintained together in a 0.4 ha pen at Washington State University (WSU), Pullman, Washington, USA, and fed alfalfa hay and alfalfa pellets ad libitum. Fresh water was available at all times. On 12 February 1996, one male Stone sheep was moved to an adjacent 0.4 ha pen which contained five Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*), consisting of three males, 1 to 3 yr old, and two females, 1 to 3 yr old. The two pens were separated by a distance of 4 m. The bighorn sheep were chronic carriers of *Psoroptes* sp. for approximately 2 yr in spite of twice yearly treatments with ivermectin (Ivomec, MSD AGVET, Rahway, New Jersey, USA) given subcutaneously at 0.2 to 0.4 mg/kg of body weight. Ear lesions were not present and mites were not detected from ear swab samples from any of the three Stone sheep on arrival at WSU or on the day of translocation.

The translocated Stone sheep died unexpectedly on 28 April 1996, 76 days after it was moved into the new pen with the five bighorn sheep. At necropsy, the sheep

weighed 21 kg and was in fair body condition. Based on lung lesions and bacterial isolations, death was attributed to bronchopneumonia caused by *Pasteurella haemolytica* and *Pasteurella multocida*. The following tissues were evaluated and appeared grossly normal: oral cavity, trachea, esophagus, heart, liver, spleen, kidney, adrenal gland, urinary bladder, rumen, reticulum, omasum, duodenum, pancreas, jejunum, ileum, colon, large intestine, reproductive organs and brain. Both external ears were partially occluded with tan crusts, and after thorough scraping with a scalpel blade, approximately 25 mites were detected in one ear and 200 mites in the other ear. Mites were mounted in Hoyer's mounting media (Wards Natural Science Establishment, Rochester, New York, USA) and identified as *Psoroptes* sp., based on the keys of Sweatman (1958). Speciation of *Psoroptes* based on morphology, location on the host, and species of host is inadequate (Boyce et al., 1990). Therefore the mites could not be speciated accurately. Representative mites were deposited in the H. W. Manter Laboratory, University of Nebraska State Museum (Lincoln, Nebraska, USA) as accession number HWML 39080.

*Psoroptes* sp. infestation in the Stone sheep must have resulted from contact with the five infested bighorn sheep, and was the cause of the ear lesions. Although only one Stone sheep had contact with the infested bighorn sheep, the mites were transferred and caused lesions similar to the *Psoroptes* sp.-induced aural lesions observed in bighorn sheep. Mites or mite-induced lesions were not detected in the two Stone sheep in the adjacent pen. It is not likely that the mites contributed to the death of the sheep because the infestation

was not severe and was confined to the ears. At the time of death, the infestation was a maximum of 76 days duration. It is not known whether *Psoroptes* sp. from bighorn sheep would spread to other parts of the body over time, or whether the mite infestation in Stone sheep could be lethal or exacerbate other disease conditions. In bighorn sheep, lesions associated with psoroptic mange or scabies are usually confined to the ears, but in some populations, lesions are present on much of the body surface; psoroptic mange has been implicated as a mortality factor in some populations of bighorn sheep (Lange et al., 1980; Welsh and Bunch, 1983; Foreyt et al., 1990). *Psoroptes* sp. was introduced into the captive population of bighorn sheep at WSU in 1990 with the introduction of an infested Rocky Mountain bighorn sheep from a free-ranging population in Oregon (USA), (W. J. Foreyt, unpubl.). Since that time all bighorn sheep at WSU have been treated with ivermectin subcutaneously at 0.2 to 0.4 mg/kg twice yearly. However, the *Psoroptes* sp. infestations have persisted at low levels in the ears of some of the captive sheep.

Other than in captive situations, free-ranging Stone sheep are indigenous to British Columbia and the Yukon Territory,

Canada (Bowyer and Leslie, 1992). There are no previous reports of *Psoroptes* sp. infestations in Stone sheep, Dall sheep (*Ovis dalli dalli*) or free-ranging wildlife in Canada or Alaska (USA); but based on this case report of one animal, Stone sheep are susceptible to *Psoroptes* sp. infestations from bighorn sheep. The full implications of infestation in Stone sheep are unknown.

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Received for publication 7 June 1996.