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PSOROPTIC SCABIES IN BIGHORN SHEEP (*Ovis canadensis mexicana*) IN NEW MEXICO[□]

R. E. LANGE,[□] A. V. SANDOVAL[□] and W. P. MELENEY[□]

Abstract: Prior to 1978, no reports were made of scabies lesions or mites recovered from any Mexican bighorn sheep (*Ovis canadensis mexicana*) examined in the San Andres National Wildlife Refuge in southern New Mexico. In 1978, all of five rams harvested by hunters had live mites of the genus *Psoroptes* and active lesions of scabies in their ears and/or on their bodies. Deaths due to scabies were not documented during this outbreak although aerial helicopter surveys conducted in March, June and September, 1979 recorded less than half the sheep observations of five previous and similarly conducted surveys. After measurement of the length of the outer opisthosomal setae of the male mites, they appear to be *Psoroptes ovis* (Hering), the common scabies mite of domestic sheep, cattle and horses. Final specific determination must await proposed transmission studies with domestic livestock.

INTRODUCTION

Mites of the genus *Psoroptes*, labeled by various authors *ovis*,⁷ *cervinae*,²¹ *cervinus*,²⁰ *communis* var. *cervinae*,⁹ and *equi* var. *ovis*¹¹ have been recovered from Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*), Mexican bighorn sheep (*O. c. mexicana*) and desert bighorn sheep (*O. c. nelsoni*). These mites have been associated with tremendous herd declines and extirpation from many ranges, but without the irrefutable establishment of a causal relationship.^{10,12,17}

Scabies epizootics in bighorn sheep were noted by observers in Colorado from 1859 to 1931.^{17,19,22} A typical report from the upper Greybull River southwest of Meeteetsee, Wyoming, in 1881, noted only a few scattered bighorn sheep on winter ranges where thousands were counted the year before.¹⁰ Other declines

are described in Wyoming and Montana in 1885,¹² California in the 1870's and 1898,¹³ and in Oregon by Bailey.³ Psoroptic mites were found on desert bighorn sheep at the Desert National Wildlife Range in Nevada in 1967 and 1969 but were not associated with a herd decline.^{4,5} Morgan in 1970 described psoroptic mange in Rocky Mountain bighorn sheep in Idaho and suggested it as a significant mortality factor.¹⁶

CASE HISTORY

A bighorn sheep hunt was conducted 1 to 9 October 1978, in the San Andres National Wildlife Refuge in southern New Mexico. Six permits were granted. Five hunters were successful and each of the harvested sheep had scabies lesions. The rams ranged in age from 4-13 years.

[□] This paper constitutes a case report and is not presented as a controlled research project. Mention of a pesticide does not constitute a recommendation by the U.S. Department of Agriculture or the state of New Mexico, nor does it imply registration under FIFRA as amended.

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LESIONS

Hunters did not report signs of pruritis, emaciation, or alopecia in the numerous sheep observed during the hunt. Each hunter noted ear lesions (Fig. 1) only after his sheep was harvested. Examination showed mites distributed in the ears and over the body. Lesions in the ears were characterized by exfoliated yellow-white raised epidermis and crusted serous exudate bearing hairs loosened from the follicles (Fig. 2). These exfoliations hid raw, depilated, reddish, serum-encrusted epidermis that had a wet appearance. Many of these areas were covered by dense colonies of deep brown mites. These lesions were present from the distal 1/4 of the ear to the external auditory meatus where the material was dark yellow, waxy and hard, blocking the meatus in several ears. The pelage on the neck of one sheep appeared rough and tufts were falling out. Other sheep had loose fur on the neck, withers, sternum, and rump; mites were collected from all of these areas.

Tufts of fur were easily removed accompanied by sheets of basal, yellow-white epidermis. When the tufts were placed on a white surface large numbers of mites could be observed moving out of the fur.

MATERIALS AND METHODS

Mites were collected from various sites on the carcasses of sheep brought through the check station and were preserved in alcohol. Gross descriptions of the lesions were recorded and photographs were taken. The mites submitted for examination, mounted in Hoyer's medium, included 5 males from the ears of one ram and 15 males from the sternum of another. A total of 8 outer opisthosomal setae (oos) were measured on the 5 ear mites and 25 on the 15 body mites.

RESULTS

The mites (Fig. 3) could not be identified as *Psoroptes cervinus* on the basis

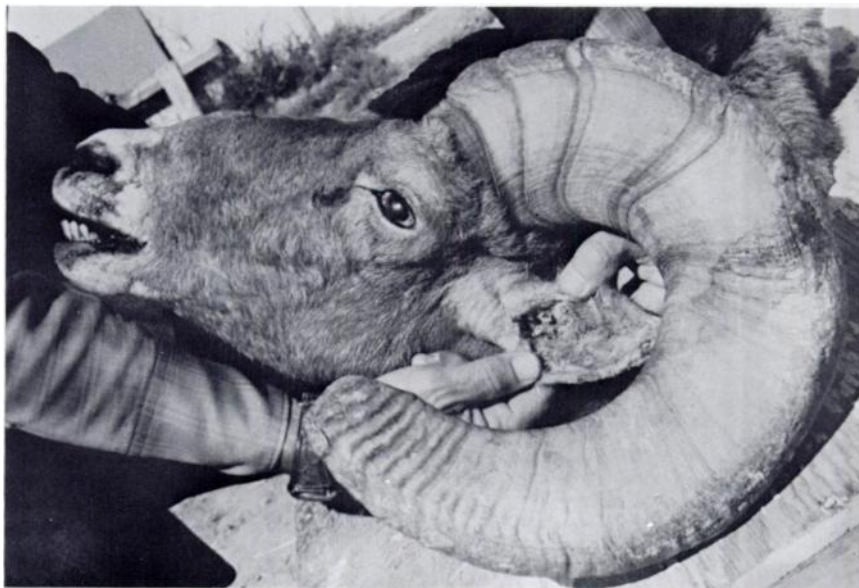


FIGURE 1. Head of bighorn ram showing location of principal psoroptic lesions.



FIGURE 2. Scabs in the ear caused by psoroptic mites.

of length of the oos of the males. Sweatman²⁰ measured 45 oos from *P. cervinus* from the ears of bighorn and found them to average 204 μm (range approx. 140-345 μm); in the New Mexico material the oos averaged 127 μm (range 109-135 μm), and the body mites oos 125 μm (range 84-180 μm). These measurements more closely adhere to those found by Sweatman for *P. ovis* (122 μm , range 73-268 μm). Final specific diagnosis of the mites infesting the San Andres bighorn will have to await transmission studies currently planned. These studies will involve transferring newly collected mites to rabbits, domestic sheep and cattle at Las Cruces, New Mexico, Fort Collins, Colorado and Kerrville, Texas to determine if they will survive on domestic stock.

DISCUSSION

The sheep herd in the area, which had been estimated at 200 prior to the epizootic, was monitored throughout the

winter. No deaths were confirmed although the numbers of sheep observed were fewer than normally seen during the winter. Some sheep were observed to have darkened areas below the ears, indicating drainage from the ears, or with ears folded ventrally. Others showed lateral or dorsal alopecia, signs of pruritis, including excessive scratching, biting, head shaking, and shrub horning. During January and February emaciated sheep were seen, a condition never before seen in this herd. Although this group of sheep had been hunted for the past 11 years, no signs of this kind had been observed previously. Surveys conducted in March, June, and September, 1979 recorded less than half the sheep observations of 5 previous and similarly conducted surveys. Mature rams and lambs were virtually absent from the last two surveys.

The San Andres National Wildlife Refuge is an extremely rugged and remote bighorn sheep habitat, harboring the only remaining native herd of

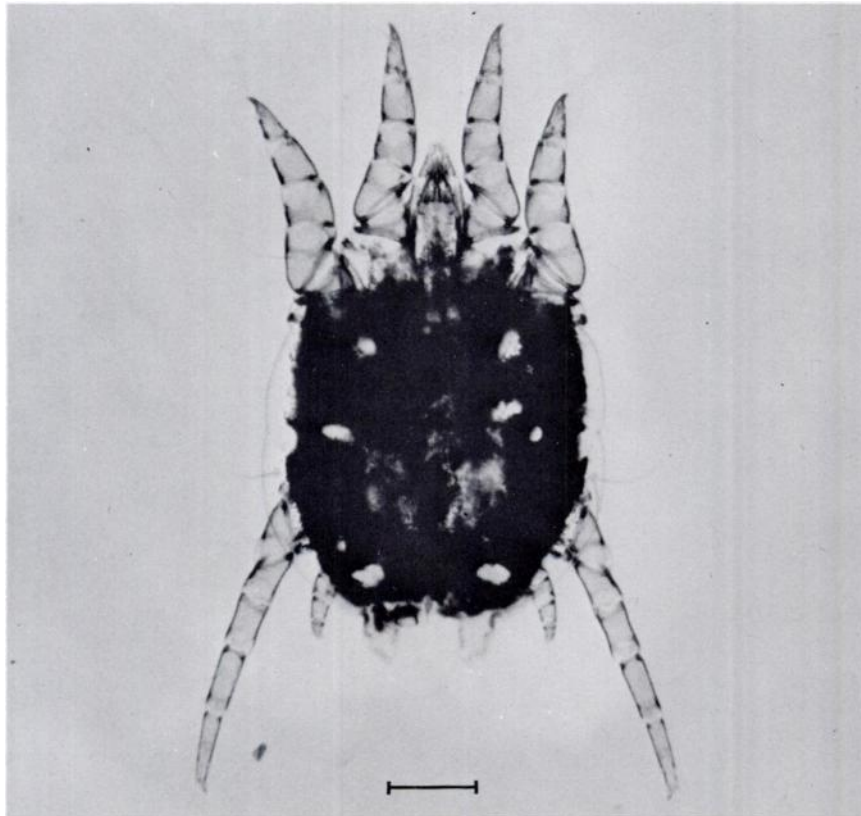


FIGURE 3. *Psoroptes* sp. adult male recovered from ear of bighorn ram. Scale = 100 microns.

bighorn sheep in New Mexico, a valuable natural resource. Since these bighorn sheep are very sensitive to any human presence, the area was closed to grazing in 1951, with only occasional cattle trespass. The sheep herd has remained stable over the last 15 years. Allen and Kennedy² did not find psoroptic mites on one individual in 1951. Game Department personnel operating check stations during the annual hunts did not observe mites or lesions on the animals. Numerous outbreaks of psoroptic scabies

have occurred in both domestic sheep and cattle in New Mexico since 1951, and the possibility of *P. ovis* being transferred to bighorn from domestic stock cannot be entirely discounted, especially in view of the observations made by Allen¹ and by Longhurst and Douglas¹⁴ in regard to the interrelationships between helminth parasites of wild and domestic ruminants.

Attempts to provide some type of mite control were initiated in January, 1978. Dust bags containing 5% coumaphos¹⁵

¹⁵ Co-Ral®, O-(3-chloro-4-methyl-2-oxo-2H-benzopyran-7-yl) O,O-diethyl phosphorothic acid. Cutter Haver, Lockhart Labs, Division of Bayvet Corp., P.O. Box 4193, Hawthorn Rd., Kansas City, Missouri 64119, USA.

were suspended over salt blocks at 38 treatment stations distributed throughout the sheep range. Virtually no utilization of the stations was noted through fall, 1979. Roberts and Meleney¹⁸ found that dusting sheep with 3% crotoxyphos[□] before exposure to scabies gave no protection against scabies infestation even though crotoxyphos as a 0.1% dip gave almost 5 months' protection and was comparable to toxaphene 0.5% dip in that regard.

Extensive ground surveys during January and February 1979 revealed very few sheep occupying the previously preferred habitats, suggesting large-scale emigration or mortality, but no evidence of mortality was obtained other than scattered groups of bones until September, 1979. In late September the remains of a young ewe, dead less than 2

weeks, was located; she had the most severe ear lesions seen to date.

Long-distance movements by desert bighorn sheep are considered uncommon,¹⁵ but could be more common in some years because of environmental pressures, the availability of food and water, and changes in population size. It has been hypothesized by Geist¹⁶ that bighorn sheep move in response to internal drives synchronized with external environmental pressures; Hansen¹⁷ hypothesized that movements may be a necessary function in the survival of some bighorn populations. Assuming these hypotheses to be correct, the sheep in the San Andres mountains may have, to some extent, shifted their normal use patterns in response to external environmental factors which may have included the scabies epizootic.

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[□] Ciodrin®, a-methylbenzyl (E)-3-hydroxycrotonate dimethyl phosphate. Shell Development Co., P.O. Box 3011, Modesto, California 95353, USA.

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