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Source: Journal of Wildlife Diseases, 18(2) : 249-251
Published By: Wildlife Disease Association
URL: https://doi.org/10.7589/0090-3558-18.2.249
SARCOPTES SCABIEI INFESTATION OF THE COYOTE (CANIS LATRANS), ILLUSTRATED BY THE SCANNING ELECTRON MICROSCOPE

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Sarcoptic mange has been reported in coyotes (Canis latrans) since the early 1800's (Jackson, 1961. Mammals of Wisconsin. Univ. of Wisconsin Press, Madison, Wisconsin, 504 p.). More recently S. scabiei infestation of coyotes has been reported from Kansas (Gier, 1968, Kansas Agric. Exp. Sta. Bull. 393: 1-118), New York (Salkin et al., 1980, J. Wildl. Dis. 16: 509-514) and Wisconsin (Trainer and Hale, 1969, Bull. Wildl. Dis. Assoc. 5: 387-391). During a recent survey of parasitic infections of coyotes on the Great Plains, several coyotes with mange were observed. The present paper deals with morphologic studies on the causative agent of that mange condition.

Six pelts obtained from fur dealers (one from Wyoming, one from Oklahoma, and four from Kansas) were examined for gross characteristics of mange. Infested skin areas were removed and digested in warm 10% KOH solution. Aliquot samples were then diluted in 50 ml of distilled water and the mites were identified in solution under the light microscope.

Square centimeter sections of normal and infested skin were washed in mild soap, then dehydrated through increasing concentrations of ethanol. The samples were critical point dried with CO₂ mounted on aluminum stubs, coated with gold-palladium under vacuum and viewed in an ETEC autoscan at accelerating voltages of 5 to 10 kV.

The signs of scabies included broken guard hairs, loss of fur, thickened wrinkled skin, and a fetid-to-mousy odor. The fur was matted and speckled with fine white flakes. The causative agent of mange was Sarcoptes scabiei, recovered from digested skin, identified by light microscopy and scanning electron microscope observations. Sarcoptes scabiei has characteristic transverse parallel ridges and numerous spines on the dorsal surface (Fig. 1). (Baker et al., 1956. A manual of parasitic mites of medical or economic importance. Tech. Publ. Nat. Pest Control Assoc., New York, 170 p.).

In a noninfested coyote the well furred parts of the body have hair follicles that divide and produce a bundle of hairs. The bundles are generally arranged in groups of two to four with three bundles the most common arrangement (Hildebrand, 1952, J. Mammal. 33: 419-428). A typical bundle consists of several wool or underfur hairs and a long single larger guard hair (Fig. 2). Hair bundles are arranged in irregular rows with hair shafts overlapping to provide insulation and protection.

The mange mite burrows into the epidermis causing an intense itching and thickening of the skin, resulting in loss of hair (Smith et al., 1972, Veterinary pathology, Lea and Febiger, Philadelphia, Pennsylvania, 1521 p.). The developing pruritus leads the coyote to scratch and rub the skin, resulting in further epithelial damage and loss of

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hair (Figs. 3 and 4). Self mutilation often leads to a secondary bacterial and fungal infection (Salkin et al., op. cit.).

The fertilized female mite burrows into the epidermis and deposits eggs, usually in groups of two or four (Mellanby, 1972. *Scabies* 2nd Ed., E.W. Classey Ltd., Hampton, England, 81 p.) Eggs of *S. scabiei*, approximately 100 μm in diameter, are shown partially embedded within the epidermis in Fig. 4. According to Melianby (op. cit.), the eggs hatch in 3
to 8 days and the larvae migrate to the skin surface, and molt successively to protonymphs, tritonymphs, and adults. The adult stage is reached 4 to 6 days after hatching. The entire life cycle takes 10 to 14 days. Transmission of mites is by direct contact with infested animals or objects contaminated by infested animals (Mellanby, op. cit.). Zeh (N.Y. Fish and Game J. 21: 182-183, 1974) has suggested that mites also could be transmitted by ectoparasites and free-living arthropods.

The epidermal burrows made by sarcoptic mange mites are found in the stratum corneum or superficial stratum spinosum (Smith et al., op. cit.). The burrowing behavior of S. scabiei is clearly illustrated in Figs. 1, 4 and 5. We also observed several mites in the same burrow (Figs. 4 and 5). Close examination of Fig. 5 reveals the body parts of several mites. It appears that the burrow reaches deep into the epidermis, possibly to the hair follicle, similar to that reported by Baker et al. (op. cit.).

The authors wish to acknowledge the technical assistance of John L. Krchma, Department of Entomology, Kansas State University.

Received for publication 7 April 1980