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Authors: TRAINER, DANIEL O., and HALE, JAMES B.

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Sarcoptic Mange in Red Foxes and Coyotes of Wisconsin*

DANIEL O. TRAINER AND JAMES B. HALE**

Department of Veterinary Science
University of Wisconsin
Madison, Wisconsin 53706

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Abstract

During the fall and winter of 1967-68 an outbreak of sarcoptic mange *(Sarcoptes scabei)* occurred in Wisconsin among red foxes *(Vulpes fulva)* and coyotes *(Canis latrans)*. Infected animals were usually partially hairless, listless, and emaciated. Skin lesions were characteristically thickened, dry, and crusted; the disease sometimes caused death. Mange occurred in the major fox and coyote ranges of the state and apparently affected fox population numbers.

Introduction

Sarcoptic mange has been recognized as a disease of wild foxes and coyotes since the 1800's.[8,11] These and subsequent reports on mange suggest that its incidence is very low and primarily incriminate individual animals or family groups,[4,5,12] although Knowles[9,11] recognized the potential of this infection as a population influence.

Over the years there have been scattered reports of mange in wild carnivores of Wisconsin. The Wisconsin Department of Natural Resources, which has maintained records on the occurrence of disease in wildlife since 1938, lists six documented cases of fox or coyote mange.[7,11]

During the fall and winter of 1967-68, what appeared to be an unusually large number of cases of sarcoptic mange in red foxes and coyotes were diagnosed at the Department of Veterinary Science, University of Wisconsin, Madison. In addition, reports of mange in these wild carnivores were received from field personnel of the Department of Natural Resources. The majority of the reported cases involved red foxes.

There were numerous reports from fox hunters and Department of Natural Resources personnel of hairless foxes which had lost their fear of man, were easily caught by dogs, killed with a club, or found dead. One conservation warden stated, "Over 50 percent of the foxes observed during 1967-68 had mange. Personally killed one with a club which was unable to run."

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**Department of Natural Resources, Division of Conservation Research and Planning.

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Laboratory Findings

Twelve cases of sarcoptic mange involving one coyote and eleven red foxes were diagnosed in the Veterinary Science laboratory. The cases came from six different counties of the state. In addition, 21 field diagnoses involving five additional counties were made by laboratory personnel.

In all of the laboratory confirmed cases at least one-half of the carcass lacked hair. The hairless areas of the body usually included the muzzle, neck, shoulders, and back, sometimes the head and tail, and occasionally the feet and ears. Typical, skin lesions of infected animals included inflammation of the skin, a leaking of exudate which coagulated and formed crusts resulting in a thickened, wrinkled, crusty skin, often with a scaly appearance. As a result of this altered condition of the skin and the lack of nourishment, the hair fell out, producing the naked appearance. Animals were invariably emaciated and often were only one-third of their "normal" weight.

Sarcoptic mites, the causative agents, were located in the skin; a final diagnosis was based on identification of the mites, *Sarcoptes scabei* var *canis*, in deep scrapings of infected areas. The scrapings were treated with a 6-percent solution of potassium hydroxide, which dissolved the debris and made microscopic detection and identification of the causative mite possible.

Questionnaire

To obtain additional information on the occurrence, distribution, and severity of mange in foxes and coyotes of Wisconsin, a one-page questionnaire was prepared and sent with an accompanying letter of explanation to 175 field personnel of the Wisconsin Department of Natural Resources. They were requested to reply concerning their respective geographic districts.

One hundred fifty-three replies (87 percent) were received and tabulated (Table 1). The majority of the individuals replying had heard of fox mange in their district (73 percent) and most of these (58 percent) had heard of it during the winter of 1967-68. In addition, 15 percent of the respondants had personally observed mange in foxes during 1967-68. A third of the participants had reports of clinical disease associated with mange during 1967-68, and 11 percent of the respondants actually observed sick mangy foxes during this period.

TABLE 1. *Summary of questionnaire results from Wisconsin Department of Natural Resources Field Personnel.*

QUESTIONS ABBREVIATED	RESPONSE* FOX	COYOTE
1. Heard of mange.	111/152 (73)	69/149 (46)
2. Heard of mange in 1967-68.	64/153 (42)	23/136 (20)
3. Personally observed mange.	43/153 (28)	11/139 (8)
4. Personally observed mange in 1967-68.	22/150 (15)	7/137 (5)
5. Heard of sick "mangy" animals.	71/148 (48)	29/138 (21)
6. Heard of sick "mangy" animals in 1967-68.	46/148 (31)	12/132 (9)
7. Observed sick "mangy" animals in 1967-68.	16/140 (11)	3/132 (2)
8. Thought that mange affects wild populations.	16/117 (14)	4/107 (4)

*The numerator represents a "yes" answer and the denominator represents the total number of replies; the number in the parenthesis ( ) represents the percent of "yes" replies.

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Although the number of cases of mange reported and observed in coyotes were considerably less than those of foxes, a similar pattern of responses was received for both species (Table 1). When mange was observed, the principal areas of involvement were reported to be the neck and shoulders, sometimes the head and tail, and occasionally the stomach, ears and feet. During the 1967-68 winter, reports of mange were received from much of the principal fox and coyote range in Wisconsin. Major epizootics of fox mange occurred in the southwest, central and north-central sections of Wisconsin (Fig. 1), while mange in coyotes was limited to the north-central area of the state (Fig. 2).

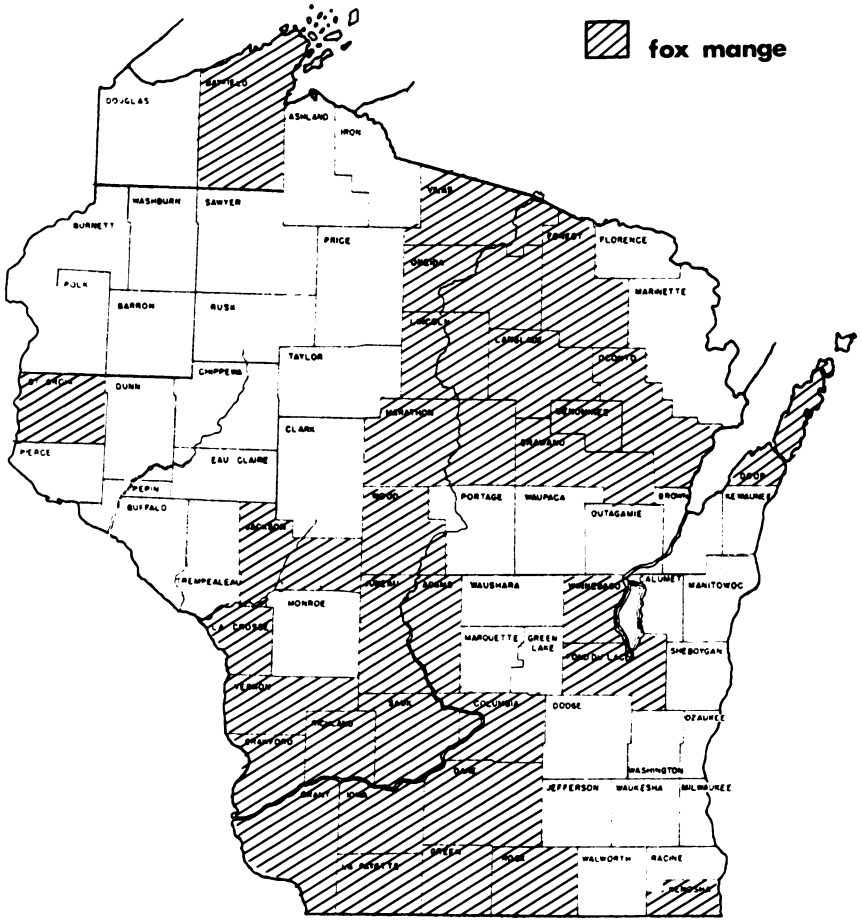


FIGURE 1. *Wisconsin counties where fox mange was observed in 1967-68 by Department of Natural Resources and/or Department of Veterinary Science personnel.*

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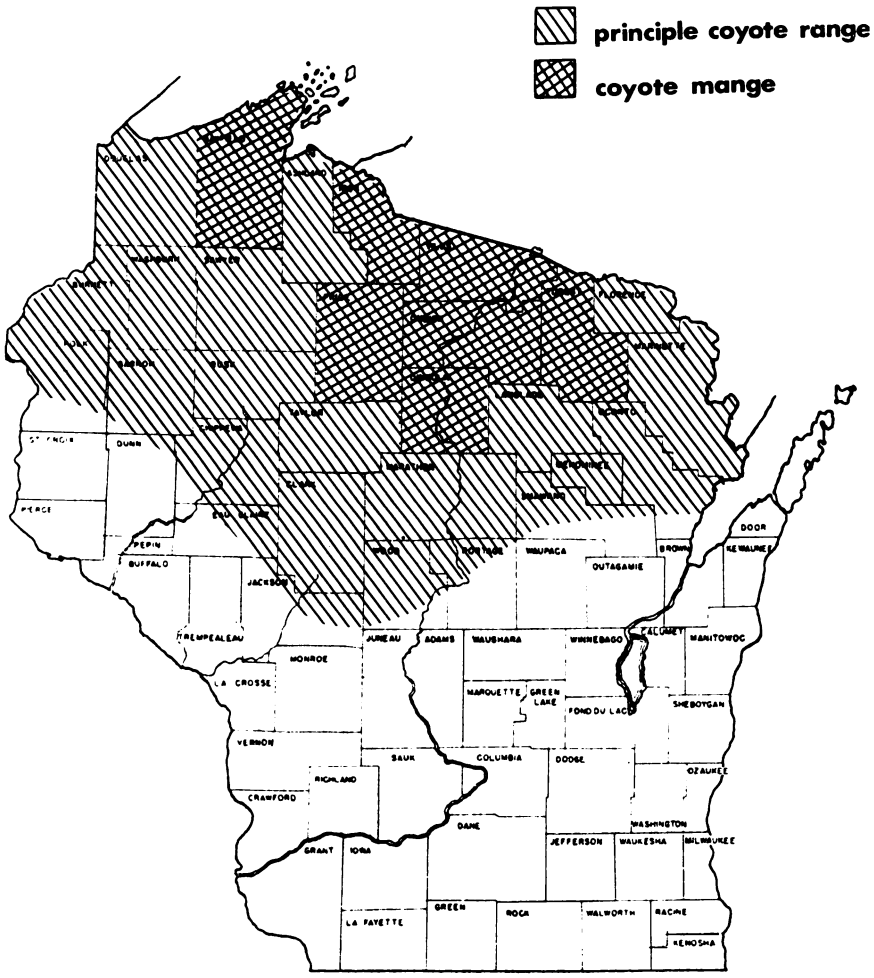


FIGURE 2. *The principle coyote range of Wisconsin and counties where coyote mange was observed in 1967-68 by Department of Natural Resources and/or Department of Veterinary Science personnel.*

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Discussion and Conclusion

Although sarcoptic mange is an acknowledged and easily recognizable disease of wild carnivores, it rarely has been recorded in Wisconsin. During the winter of 1967-68, however, a substantial epizootic occurred which apparently involved most of the principal fox range and a major segment of the coyote range in the state.

The fact that both foxes and coyotes were infected in certain geographic areas, especially the north-central, suggests that mange is capable of interspecies transmission. In general, the reported occurrence of mange was related to fox densities, with the majority of cases reported in the major fox range.[8] A similar situation existed for the coyote with the majority of cases localized in the north-central section of the state.[9]

During the 1967-68 mange epizootic, no cases were observed or reported in gray foxes *(Urocyon cinereoargenteus)* which exist in good numbers in certain areas of the state.[8] This finding agrees with earlier conclusions drawn by Pryor,[13] and others that the red fox is more susceptible to sarcoptic mange than is the gray.

Fox population information in Wisconsin is based on fur buyers' reports. They indicate that a reduction of fox numbers occurred during and following the 1967-68 outbreak. For example, fur buyers purchased 25,192 red fox pelts in 1968 compared to 43,405 in 1967, despite a slightly larger number of trappers and higher pelt value in 1968.[6]

The reports of sick mangy animals by hunters, the opinions of field personnel that mange caused clinical disease, and available fox population data, all suggest that the 1967-68 epizootic did affect fox numbers in certain areas of the state. The potential of this disease as a population control agent has been long recognized,[1,8] and even advocated as a biological control method.[10] Actual documentation of the disease and its significance, however, for the most part has been neglected. The persistence and significance of this disease in Wisconsin during subsequent years will be of particular interest and importance.

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