Dermatophilus congolensis Infections in Wildlife in New York State

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Dermatophilus congolensis infection is described for the first time in a woodchuck (Marmota monax) and a striped skunk (Mephitis mephitis). This actinomycete was also recovered from a raccoon (Procyon lotor) carcass which had been frozen for a year. Encrusted lesions or denuded patches or both were seen during necropsy on the head, thorax, abdomen, and legs of each carcass. D. congolensis was demonstrated in strained smears or paraffin sections or both from the three animals and was recovered from lesions induced in a rabbit's ear by inoculation with infected raccoon tissue. This expands to 59 the number of cases of dermatophilosis found in wildlife and domestic animals in New York State and vicinity.

Dermatophilosis, an exudative epidermitis first reported in cattle in Africa in 1915, is caused by the aerobic, gram-positive actinomycete Dermatophilus congolensis (4, 5, 20). The disease occurs all over the world, but most frequently in tropical and subtropical climates (7, 16). Cattle, sheep, horses, and goats are the most common hosts, but D. congolensis has been isolated from many other mammals, including humans (1, 3, 6, 8, 10, 16), and in at least two cases from lizards (11, 15).

D. congolensis infections in wild and domestic animals, including the first known cases of the disease in white-tailed deer (Odocoileus virginianus), raccoons (Procyon lotor), and humans, have been reported in New York State during the past 20 years.

In this report, we present two cases of dermatophilosis involving hitherto unreported hosts, the woodchuck (Marmota monax) and the striped skunk (Mephitis mephitis), and describe the recovery of the agent from lesions on a raccoon carcass which had been frozen for a year. These sources represent new potential reservoirs from which the pathogen might be transmitted to other wildlife, domestic animals, and humans.

MATERIALS AND METHODS

Deaths of the affected animals. An adult male striped skunk was observed acting in a peculiar manner in the village of Homer, Cortland County, N.Y. The animal walked in circles, constantly attempting to lick its front paws. It appeared to be blinded by growths around its eyes and paid little attention to the surrounding human activities. Since it was considered a potential threat to humans, it was trapped and sacrificed on 12 December 1979.

A severely emaciated, adult female woodchuck was found moribund in the town of Blenheim, Schoharie County, and sacrificed on 23 April 1979.

An adult male raccoon was observed in the town of Chenango, Broome County. Its sick, mangy appearance and behavior caused it to be shot by a conservation officer on 29 July 1977. The carcass was labeled, placed in a plastic bag, and stored in a home-type food freezer (−7°C) for subsequent necropsy. However, the files on the animal were misplaced, and the carcass remained in the freezer until 29 June 1978, when it was submitted for study.

Microscopic studies. All animals were submitted for necropsy to the Wildlife Research Center of the New York State Department of Environmental Conservation. Portions of skin bearing crusts or scales or both and alopecic areas were excised from multiple sites on each animal. A part of each specimen was rubbed on a microscopic slide and stained with Giemsa stain for direct microscopic observation. The rest of each specimen was submitted to the Laboratories for Mycology and Mycobacteriology, New York State Department of Health, for histopathological and bacteriological studies. Portions were fixed in 10% Formalin, embedded in paraffin by standard techniques, sectioned, and stained with hematoxylin and eosin, Giemsa, or methenamine silver stain.

Bacteriological examination. Scabs and crusts from the woodchuck and the skunk were rinsed in sterile membrane (Millipore Corp.)-filtered water, and the underside of each scab and crust was rubbed over areas of approximately 3 cm² on beef heart infusion-5.5% horse blood agar plates. The inoculated areas were then streaked for bacterial isolation, and the plates were incubated at 37°C. Denuded portions of
skin were also rubbed over small areas on plates of the same medium, and the inoculated areas were streaked for bacterial isolation.

Isolation of \( D. \) congolensis from encrustations on the raccoon carcass was attempted by the rabbit passage technique (6).

RESULTS

Necropsy. In the skunk, extensive encrusted lesions were evident on the snout, around the eyes, and under the chin. Encrustations were also found on the axillae, wrists, ankles, and digits of the front and hind legs. Alopecic areas were noted over the entire carcass, and at many sites the skin appeared to be sloughing, creating a dandruff-like condition.

The woodchuck was emaciated (body weight, 1.5 kg at necropsy), with encrusted lesions on the head, neck, legs, and feet and scattered over the abdomen and back (Fig. 1 and 2). Alopecia was evident on the head, legs, and abdomen. Only the tail appeared to be uninvolved.

The raccoon’s skin appeared dry and freezer burned, but encrusted lesions were still evident about the eyes, snout, neck, hocks, sides, and legs. Several areas were alopecic.

Microscopic observations. Giemsa-stained smears from lesions on all three carcasses showed branching filaments diagnostic of \( D. \) congolensis, appearing divided into three planes and, in several instances, beginning to break into packets of coccoid cells. Similar structures were found in smears from lesions on the regions of the rabbit’s ear inoculated with portions of tissue from the raccoon.

In the skunk, Giemsa-stained sections of encrusted lesions revealed typical \( D. \) congolensis filaments within the epidermal tissue. In the woodchuck, hyperkeratosis, mild acanthosis, occasional microabscesses, and infiltration of leukocytes, mainly neutrophils, were found in hematoxylin- and eosin-stained sections of tissue. Giemsa-stained sections of the same tissue contained regularly aligned, filamentous arrangements of coccoid cells highly suggestive of \( D. \) congolensis.

Bacteriological studies. An erythematous rash appeared on the rabbit’s ear within 48 h of inoculation with tissue from the raccoon. This was followed by the development of pustules and encrustations. \( D. \) congolensis was cultured from several of these pustules, but was not recovered from tissues of either the skunk or the woodchuck.

DISCUSSION

The observation of branching, septate filaments characteristic of \( D. \) congolensis in Giemsa-stained smears and stained tissue sections from the woodchuck and striped skunk adds these two animals to the list of hosts of this pathogenic actinomycete. The skunk infection is the first to be found in a member of the family Mustelidae (minks, otters, weasels, etc.).

We cannot account for the failure to recover \( D. \) congolensis in cultures from the lesions of the woodchuck or skunk. Inhibition or overgrowth by competing bacteria was not evident, and previous studies had demonstrated that the actinomycete can remain viable in animal tissues for extended periods. It has been cultured from such seemingly inhospitable environments as dried raccoon hides (14).

Large populations of woodchucks are frequently found in open pastures in close proximity to farm animals and humans. An infected woodchuck in such an environment could serve as a source of dermatophilosis for domestic animals. Ticks, flies, and winged ants can transmit the infection from diseased to healthy animals (7, 17).
The recovery of *D. congolensis* from the raccoon indicates that the actinomycete can remain viable in frozen tissue for more than a year. Thus, the carcass of a *D. congolensis*-infected wild animal which has remained frozen throughout the winter could become, upon thawing in the spring, a source for direct or indirect transmission of the disease to other wildlife and humans.

Our laboratories have thus far identified in the state of New York and the immediate vicinity 27 cases of dermatophilosis in white-tailed deer (3, 6, 12, 13, 18, 19; plus 8 unpublished cases), 10 cases in raccoons (14; plus 2 unpublished cases), and 4 cases in humans (3) in addition to those presented here. The disease has been reported by others in 10 horses from New York and 5 from Vermont (2). This constitutes a greater number of cases of dermatophilosis and a more diverse range of hosts than have been reported from any other state or region within the United States (9).

**LITERATURE CITED**


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