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Dermatophilus DERMATITIS ENZOOTIC IN DEER IN NEW YORK STATE AND VICINITY

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Abstract: In a recent 2-year period *Dermatophilus congolensis* infection, ranging from mild to very severe, was found in 15 white-tailed deer (*Odocoileus virginianus*) taken in southeastern New York State (12) adjacent New Jersey (2) and central Vermont (1). The host range for *Dermatophilus congolensis* is given.

INTRODUCTION

Dermatophilus congolensis infection was first noted in 1915 in African domestic cattle[34] and is usually manifested as an exudative epidermitis (dermatophilosis, streptotrichosis, mycotic dermatitis, lumpy wool). The disease commonly affects cattle, sheep, goats and domesticated equines in many parts of the world, often creating severe economic problems.[1,35] Infection has been reported in a number of additional mammalian hosts, including the polar bear (*Thalarctos maritimus*);[24,33] domestic cat (*Felis domesticus*);[3,26] chamois (*Rupicapra rupicapra*);[25] domestic dog (*Canis familiaris*);[5] eland (*Taurotragus oryx*);[14] fox (*Vulpes vulpes*);[2] giraffe (*Giraffa cameleopardalis*) and Thomson's gazelle (*Gazella thomsonii*);[21] gerbil (*Gerbillus* sp.), hare (*Lepus* sp.) and hedgehog (*Erinaceus europaeus*);[19] owl monkey (*Aotus trivirgatus*,[7,17,22] woolly monkey (*Lagothrix lagotrichia*);[8] pig (*Sus scrofa*);[24] cottontail rabbit (*Sylvilagus floridanus*);[31] raccoon (*Procyon lotor*);[30] South American seal (*Otaria bryonia*);[9] Columbian ground squirrel (*Citellus columbianus*);[39] and zebra (*Equus* sp.).[13] The only non-mammalian host thus far encountered is the Australian bearded lizard (*Amphibolurus barbatus*),[23,32] Ten human cases also have been reported.[6,11,15,16,20]

The first report of *Dermatophilus* infection in a white-tailed deer (*Odocoileus virginianus*) was by Dean *et al.*[6] in New York State. In 1970, the death of a white-tailed deer fawn in South Carolina was attributed to dermatophilosis,[18] and in 1972 two more cases in this host were reported from New York.[36,37]

The present report was occasioned by the finding, in a recent 2-year period, of 15 additional cases of *Dermatophilus* dermatitis in wild deer, 12 within the State of New York, 2 in adjacent New Jersey, and 1 in nearby Vermont. Nine occurred between June and December, 1974 and 5 between September, 1975 and January, 1976.

MATERIALS AND METHODS

Specimens brought to the microbiology laboratory for examination included ears, or portions thereof, excised portions of skin bearing crusts or scabs, eroded or denuded areas of skin, pustules and detached scabs. Crusts, scabs and pustules were rinsed several times in sterile distilled water, and the underside of each was rubbed on an area approximately 2 cm^2 of a beef heart infusion—5.5% horse blood agar plate. This was streaked for bacterial isolation, and the plates were incubated at 35 C. The same specimens also were rubbed on microscope slides and stained by the Giemsa method or with methylene blue. Denuded

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skin was decontaminated with 70% ethanol and scraped deeply with a sterile scalpel, and smears and cultures were prepared from this material as described above. Portions of all specimens also were placed in 10% formalin and were subsequently sectioned and stained with hematoxylin and eosin, Giemsa stain and methenamine-silver.

In some instances, cultures of *D. congolensis* were obtained by rabbit passage. An area approximately 4 cm^2 on the outer surface of the ear of an albino laboratory rabbit (*Oryctolagus cuniculus*) was disinfected with 70% ethanol, lightly scarified with a scalpel, and then rubbed with affected tissue from the deer.

RESULTS

Data on the 15 affected deer are presented in Table 1. Reports of the first three of these cases have been published.[28,29] Geographic distribution is indicated in Figure 1. The gross appearance of a particularly severely diseased animal (case 10) is shown in Figure 2.

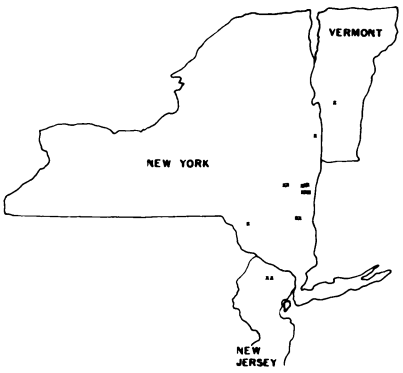


FIGURE 1. Distribution of cases of dermatophilosis in deer in New York State and adjacent Vermont and New Jersey.

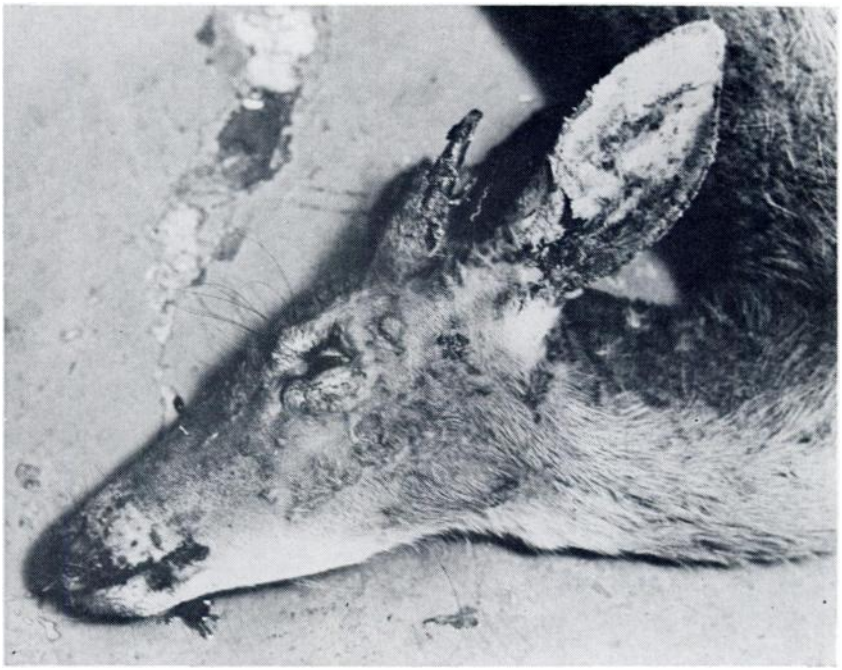


FIGURE 2. Severe **Dermatophilus** dermatitis in adult male deer (case no. 10), with desquamation of skin of the snout, antlers and ears. The entire body was covered with eruptions.

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TABLE 1. **Dermatophilus** infection in white-tailed deer, 1974-76.

Case no.	Date	County[a]	Age, Sex	Description	Confirmed by[b]		
					Direct examination	Direct culture	Rabbit passage
1	7/74	Morris, NJ	2 wk, M	Encrusted papules on muzzle and ears.	+	+	ND
2	7/74	Morris, NJ	2 wk, F	Encrusted papules on muzzle and ears.	+	ND	ND
3	10/74	Greene	5.5 yr, F	Lactating; emaciated; scattered encrusted lesions on legs, flanks and back. Cultures from leg. Also had alternariosis.	+	+	+
4	7/74	Columbia	5 wk, M	Complete body involvement; died shortly after arrival at the laboratory.	+	+	ND
5	10/74	Roxbury, VT	Fawn, M	Extensive hair loss everywhere except legs and tail, especially head and neck. A few encrusted lesions. Cultures from base of ears.	+	+	ND
6	10/74	Columbia	1.5 yr, M	Paintbrush effect; acute lesions along back with spreading.	+	—	ND
7	10/74	Columbia	?, F	"Brushfire" effect.	+	—	+
8	12/74	Columbia	2.5 yr, M	"Brushfire" effect. Alopecia over sacral, lumbar and thoracic vertebrae, and on both sides.	+	—	+

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TABLE 1 (Continued)

Case no.	Date	County[a]	Age, Sex	Description	Confirmed by[b]		
					Direct examination	Direct culture	Rabbit passage
9	12/74	Columbia	6.5 yr, F	"Brushfire" effect. Alopecia over sacral, lumbar and thoracic vertebrae, and on both sides.	+	—	+
10	9/75	Sullivan	1.5 yr, M	Entire body covered with eruptions; skin rotted on ear, snout and antlers. Sections full of *D. congolensis.*	+	+	ND
11	11/75	Columbia	1.5 yr, M	"Brushfire" effect. Alopecia over sacral, lumbar and thoracic vertebrae and on both sides.	+	+	ND
12	12/75	Greene	7.5 yr, F	Denuded along back and much of both sides of thorax and abdomen.	+	—	ND
13	12/75	Dutchess	2.5 yr, F	Area of alopecia over lumbar region and several more on thorax, with whitish pustules.	+	—	+
14	1/76	Dutchess	15 yr, F	Extensive infection of skin over sacral and lumbar vertebrae, extending down the flanks.	+	—	ND
15	8/76	Washington	12 wk, F	Found moribund. Pustules and scabs about the nose, lips, eyes, ears, legs, haired regions of the toes, abdomen, and back.	+	+	+

[a]In New York State except where noted.

[b]+ = positive, — = negative, ND = not done.

Bacteriology

In the cases in which *D. congolensis* was cultured directly from lesions, typical colonies[10] appeared within 48 h. They were 0.5-1 mm in diameter, opaque white to yellowish, glabrous, rough, raised, round to square or irregular in shape, tough and adherent. They pitted the agar and left mycelia in the medium when the colonies were removed.

Methylene blue- or Giemsa-stained smears from lesions (Fig. 3), as well as tissue sections, showed the diagnostic branching filaments of *D. congolensis*, which divide both transversely and longitudinally and become converted into packets of cocci.

Inoculation of rabbit ears with infected tissues resulted in the appearance of an erythematous rash within 72 h, followed by multiple small pustules which developed scabs. The infection was self-limiting. *D. congolensis* was observed in Giemsa-stained smears of pustules or of the underside of scabs and was cultured from these materials.

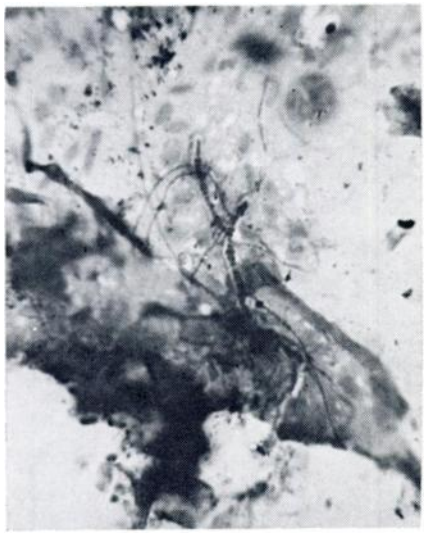


FIGURE 3. Smear of exudate from lesion of case no. 10, illustrating septate branching filaments of **D. congolensis**. Older hyphae are dividing in three planes to form cocci. Note long, slender, nonseptate, young branches. Giemsa stain, X 1200.

DISCUSSION

Dermatophilosis (streptotrichosis) has been defined[35] as "an acute or chronic infection of the epidermis resulting from an exudative dermatitis with scab formation, caused by *Dermatophilus congolensis*." In domestic cats, granulomata of the tongue and of the urinary bladder also have occurred.

The clinical spectrum of epidermitis ranges from a paintbrush effect (tufts of hair fused by exudate) through nodular and pustular lesions to severe exudative epidermitis with scabbing and crusting, often accompanied by secondary bacterial infection. A "brushfire" effect (generalized hair loss over the saddle and rump, with solitary tufts of hair at the periphery) also can be seen during the rutting season.

Obtaining pure cultures is often difficult because of bacterial contamination but usually can be accomplished by informed selection of specimens and careful bacterial streaking on blood agar plates. Alternatively, tissues from a diseased deer are examined microscopically, and samples in which *D. congolensis* is observed are inoculated into a rabbit's ear. The inocula raise typical lesions on the ear, and scrapings from these lesions are cultured. In our hands *D. congolensis* always has been recovered by this procedure.[12]

Transmission of infection is by direct contact and possibly by means of vectors.[27] Deer must, therefore, be considered a potential source of infection for domestic cattle. However, although dermatophilosis in cattle has been reported from many parts of the United States, thus far it has not been recognized in New York. Infection of horses has been noted in New York State and Vermont.[4] The first four known cases of spontaneous dermatophilosis of humans, contracted from a single infected deer, were reported from New York State[6] and the fifth from Toronto, Canada.[11]

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Dermatophilus infection of deer has not, except for the single case in South Carolina,[18] been reported anywhere except in New York State and its immediate vicinity, where there are now 18 known instances. The sighting of many additional deer with the "brushfire" effect has been reported to us by wildlife technicians. The disease undoubtedly occurs elsewhere and probably is misdiagnosed clinically—but as what?

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