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Authors: Mörner, Torsten, and Mattsson, Roland

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Tularemia in a Rough-legged Buzzard (*Buteo lagopus*) and a Ural Owl (*Strix uralensis*)

Torsten Mörner and Roland Mattsson, National Veterinary Institute, S-750 07 Uppsala, Sweden

Tularemia is a plague-like disease, normally associated with rodents and lagomorphs (Hopla, 1974, Adv. Vet. Sci. Comp. Med. 18: 25–53; Reilly, 1970, *In* Infectious Diseases of Wild Mammals, Iowa State Univ. Press, Ames, Iowa, pp. 175–199). In Sweden the disease is seen commonly in the varying hare (*Lepus timidus*) (Borg, 1969, Nord. Veterinaermed. 21: 95–104). The role of birds in the epidemiology and dissemination of the disease is not known fully although a few reports are available on the occurrence of tularemia in birds (Green and Wade, 1929, Proc. Soc. Exp. Biol. Med. 26: 626–627; Green and Skillinger, 1932, Proc. Soc. Exp. Biol. Med. 30: 284–287; Kursban and Foshay, 1946, J. Am. Med. Assoc. 131: 1493–1494; Hopla, 1974, op. cit.). In Sweden Rehbinder and Karlsson (1979, Nord. Veterinaermed. 31: 339) demonstrated infection in common ravens (*Corvus corax*) by the fluorescent antibody (FA) technique. This paper describes the demonstration of infection with *Francisella tularensis* in two birds of prey in Sweden.

An adult male rough-legged buzzard was found dead in a field near the town of Ystad in the southern part of Sweden. It was found in the autumn (November) when this species migrates southward from its northern breeding grounds. It was frozen and submitted for postmortem examination approximately 7 mo after death.

The bird was necropsied and was in a good state of nutrition. A moderately enlarged spleen was the only gross finding. No histological examination was performed on this bird and no attempts to isolate bacteria were made. Liver and spleen tissue smears were tested with the FA technique as described by Karlsson et al. (1970, Acta Pathol. Microbiol. Scand. Section B Microbiol. 78: 647–651) and were positive for *F. tularensis*.

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An adult female Ural owl was observed in September in a village in the northern part of Sweden. It was fearless and made no attempt to fly when confronted by humans and was found dead a few days after the first sighting.

The bird was examined at necropsy and specimens from internal organs were fixed in 10% formalin, sectioned and stained with hematoxylin-eoxin. Specimens from liver, spleen, and intestines were cultivated on agar medium containing tryptose broth, cystein-HCl, sodium thioglycolate and rabbit blood (Gaspar et al., 1961, J. Bacteriol. 82: 564–569) and on blood-agar plates. No FA test was conducted on this bird.

The owl was anemic and emaciated. The spleen was moderately enlarged and liver, kidneys, and lungs were reddened. Histological examination showed congestion of kidneys, heart, liver, spleen, and lungs. No changes were seen in the bone marrow and necrotic lesions were not found in any organ. No growth was seen on the blood-agar plates, but small *F. tularensis*-like colonies grew on the cysteine-agar plates. The isolates fermentated glucose, but not glycerol or maltose. They did not grow on medium containing citrillin, were highly sensitive to erythromycin and were characterized as *F. tularensis* var. *holarctica*. The isolate was sent to Professor N. G. Olsufjev, Tularemia Laboratory, Moscow, USSR, for further investigation and this identification was verified.

The susceptibility of raptors for *F. tularensis* is poorly understood. Nakamura (1950, Auk 67: 383) isolated the bacteria from the liver of a red-tailed hawk (*Buteo jamaicensis*) but did not believe that the infection was fatal. Alonso et al. (1975, Med. Mal. Inf. 5: 39–48) infected five common buzzards (*Buteo buteo*) with *F. tularensis*, but the infection did not cause illness in any of the birds.

In the present study several facts indicated that the infection with *F. tularensis* in the buzzard and owl might have been fatal. The only

pathological condition observed in the buzzard was an enlarged spleen. This picture can sometimes be seen in birds with other *Pasteurella* infections (Gratzl and Köhler, 1968, *In* Specielle Pathologie und Therapie dur Geflügelkrankheiten, Verlag, Stuttgart, West Germany, pp. 493–531). The absence of other pathogens indicates that tularemia was probably the primary cause of death.

The typical post-mortem picture of emaciated owls is atrophy of the pectoralis muscles, generalized anemia and ulcers in the gizzard. The Ural owl was in very poor condition but not totally starved. The lesions observed at necropsy were typical of starving birds except for the marked congestion of the spleen. Usually the spleen is small and pale, due to loss of blood due to the ulcers. Histologic findings showing congestion in internal organs and the isolation of *F. tularensis* could indicate that death was not merely caused by starvation, but a combination of poor condition and tularemia.

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Cutaneous Granules Associated with Dermatophilosis in a White-tailed Deer

I. F. Salkin and M. A. Gordon, Center for Laboratories and Research, New York State Department of Health, Albany, New York 12201, USA; **and W. B. Stone,** Wildlife Research Center, New York State Department of Environmental Conservation, Delmar, New York 12054, USA

Dermatophilosis, an exudative epidermitis caused by the aerobic actinomycete *Dermatophilus congolensis*, occurs worldwide but is more prevalent in tropical or subtropical climates. Although the disease is most frequently found in domestic animals (cattle, sheep, goats, horses), many species of wildlife have been affected (Richard, 1981, *In* Infectious Diseases of Wild Mammals, Davis et al. (eds.), Iowa State Univ. Press, Ames, Iowa, pp. 339–346). During the last 5 yr we have observed in New York State and vicinity, 27 cases of dermatophilosis in white-tailed deer (*Odocoileus virginianus*), 10 cases in raccoons (*Procyon lotor*), and one each in a woodchuck (*Marmota monax*) and a striped skunk (*Mephitis mephitis*) (Salkin et al., 1975, J. Am. Vet. Med. Assoc. 157: 571–573; Gordon et al., 1977, J. Wildl. Dis. 13: 184–190; Salkin et al., 1981, J. Clin. Microbiol. 14: 604–606). In all of these cases the etiologic agent was restricted to the epidermal tissue. However, Gibson and co-workers (Gibson et al., 1983, Vet. Pathol. 20: 120–122) recently described subcutaneous and lymph node granulomas caused by *D. congolensis* in a steer and the presence of actinomycotic granules.

We now report a case of suspected systemic dermatophilosis in a white-tailed deer fawn. This is the first instance, in any animal, in which *D. congolensis* has been isolated from the kidney and liver and only the second in which actinomycete granules have been observed.

The frozen carcass of a severely emaciated white-tailed buck fawn was found in a field on a farm in the township of Salem, Washington County, New York in February 1981. A "mangy" appearing deer, believed to be the same animal, had been seen in the area for several months prior to the finding of the carcass. The unusual appearance of the animal prompted the farmer who found the deer to report the case to the local conservation officer.

Gross examination revealed an emaciated animal (gross weight of 23.6 kg) with hair loss over all parts of the body, but especially pronounced on both sides of the back, extending from the last four thoracic vertebrae to the sacrum. Yellow-white to cream-white encrustations covered the surface of the alopectic areas, the lateral and medial aspects of the hocks,

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