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Authors: Zarnke, Randall L., and Schlater, Linda

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Actinobacillosis in Free-ranging Snowshoe Hares (*Lepus americanus*) from Alaska

Randall L. Zarnke¹ and Linda Schlater,² ¹ Alaska Department of Fish and Game, 1300 College Road, Fairbanks, Alaska 99701, USA; ² National Veterinary Services Laboratories, United States Department of Agriculture, P.O. Box 844, Ames, Iowa 50010, USA

ABSTRACT: *Actinobacillus capsulatus* was isolated from lung, liver, and/or spleen tissue of three snowshoe hares (*Lepus americanus*) in Alaska. This is the first report of the isolation of this bacterium from free-ranging hares. *Actinobacillus capsulatus* may have a negative impact on the population density of hares.

Key words: Actinobacillosis, *Actinobacillus capsulatus*, Alaska, bacteriology, case report, *Lepus americanus*, snowshoe hare.

An adult female snowshoe hare (*Lepus americanus*) was found dead on 28 January 1982, near Fairbanks, Alaska (64°53'N, 147°50'W). Necropsy was conducted at the Alaska Department of Fish and Game (Fairbanks, Alaska 99701, USA). Approximately 100 1.0-mm-diameter, slightly raised, glossy, cream-colored plaques were found on the surface of the lungs. Similar plaques were found on the tracheal mucosa and on the parietal pleura. A pure bacterial culture was isolated on sheep blood agar (Baltimore Biological Laboratories, Cockeysville, Maryland 21030, USA).

On 16 May 1983, an adult male hare was found dead at the same location as the first case. At necropsy, slight splenomegaly and hepatomegaly were observed. Bacteria with characteristics identical to those of the strain from the first case were isolated on sheep blood agar (Baltimore Biological Laboratories, Cockeysville, Maryland 21030, USA) from both spleen and liver in a mixed culture with *Escherichia coli* and *Corynebacterium* sp.

On 26 June 1985, an adult male hare was observed behaving abnormally near Delta Junction, Alaska (64°05'N, 145°45'W), which is approximately 160 km southeast of Fairbanks. The hare's actions were sluggish and it exhibited little fear of humans or dogs. The hare was killed

and submitted to the Alaska Department of Fish and Game for examination. At necropsy, slight hepatomegaly, splenomegaly, and mild congestion in the distal lobes of both lungs were observed. Bacteria identical with the previous strains were isolated on MacConkey and sheep blood agar (Difco Laboratories, Detroit, Michigan 48232, USA) from liver tissue in pure culture and from lung tissue in mixed culture with *Alcaligenes faecalis*.

The organism was a Gram-negative coccobacillus with bipolar staining. After 24 hr incubation at 37 C, colonies on bovine blood agar were approximately 1.5 mm in diameter, smooth, low convex with entire margins and gray in color. Colonies were slightly adherent to the agar, indicative of the presence of a capsule. It was not necessary to increase CO₂ tension for adequate growth. There was a zone of incomplete hemolysis under each colony. Acid, but no gas, was produced from L-arabinose, cellobiose, D-glucose, lactose, maltose, D-mannitol, raffinose, salicin, sucrose, trehalose, and D-xylose. Acid was not produced from adonitol, dulcitol, or D-sorbitol. Catalase, indole, and motility tests were negative. Positive test results were observed from the following: aesculin hydrolysis, beta-galactosidase, cytochrome oxidase, nitrate, and urease. The isolate reduced methylene blue milk.

Bacteria with physical and biochemical properties similar to those reported for the present cases were isolated from caged Angora and mixed breed rabbits in Sri Lanka (Arseculeratne, 1961). This species was named *Actinobacillus capsulatus* (National Collection of Type Cultures #11408, Colindale, London, Great Britain). The snowshoe hare isolate is a non-hemolytic

and D(-) sorbitol variant of *A. capsulatus* (M. Bisgaard, pers. comm.).

Various *Actinobacillus* spp. are pathogens of domestic animals. Members of this genus cause suppurative or granulomatous lesions in cattle, sheep, horses, and swine. *Actinobacillus* spp. were implicated in cases of pneumonia in both bighorn sheep (*Ovis canadensis*) and pronghorn (*Antilocapra americana*), splenic abscesses in pronghorn, and jaw abscesses in elk (*Cervus elaphus*) from Wyoming (Thorne, 1982). When domestic rabbits were exposed to *A. capsulatus* by intravenous injection, they developed lung and liver lesions and thus exhibited tissue tropism similar to what we have observed in naturally infected hares (Arseculeratne, 1962).

We believe this is the first report of isolation of *A. capsulatus* from free-ranging hares. We acknowledge the possibility that the bacterium may be an opportunistic secondary invader, but we feel that isolation of the organism in pure culture from animals with fatal infections suggest it may act as a primary pathogen. Similarity of tissue tropism reported here to that reported previously for experimentally infected rabbits (Arseculeratne, 1962) lends additional support to our position.

Infection of caged rabbits probably occurred via breaks in the skin over tarsal joints. Although the natural route of infection of *A. capsulatus* in hares is unclear, the variety of organs from which the organism was isolated suggests a bacteremia occurred following initial infection. It is possible that *A. capsulatus* may be one of many factors involved in the periodic decline of snowshoe hares in Interior Alaska. We plan to monitor the occurrence of similar cases as the hare population increases to complete its normal 10-yr cycle.

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