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Blastomycosis in Wild Wolves

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ABSTRACT: Blastomycosis was fatal to a wild wolf in Minnesota, and serologic evidence of blastomycosis was found in a Wisconsin wolf. No unusual movements were detected in the Minnesota animal from October 1983 through October 1985. However, by early December 1985, this wolf was weak and debilitated, and it perished on 14 December after approaching a human residence.

Key words: Blastomycosis, immunodiagnosis, fungus, Minnesota, pneumonia, timber wolf, zoonosis, *Canis lupus*.

Blastomycosis is a primary pulmonary disease of humans and dogs, and occasionally of other animals (Jungerman and Schwartzman, 1972; Stroud and Coles, 1980; Legendre et al., 1981), which can disseminate to the skin and other organs. It is a chronic pyogranulomatous disease caused by the dimorphic fungus, *Blastomyces dermatitidis*. Canine blastomycosis is characterized by chronic cough, dyspnea, weakness, lethargy, lameness, anorexia, weight loss, nasal and eye discharge, and cutaneous lesions or tumor-like lumps. The untreated disease is often fatal (Legendre et al., 1984).

This note reports a case of blastomycosis in a wild wolf (*Canis lupus*) from Minnesota and serologic evidence of blastomycosis from another free-ranging wolf in Wisconsin. The Minnesota specimen, an adult male wolf (6530) from the Perch Lake pack (Mech and Hertel, 1983), was live-trapped (Mech, 1974) in St. Louis County four times between 12 August and 6 October 1983. He weighed from 23.6 to 32.3 kg, the latter with his stomach full. He was located by radio telemetry 135 times over a 1,867 km^2 area through 30 October 1985, during which time no unusual movements were detected.

The animal was lost to tracking attempts from 6 October until 8 December 1985 when he was observed feeding on a deer (*Odocoileus virginianus*) carcass approximately 100 m from a cabin 16 km east of our study area. The cabin residents reported that the wolf was weak and debilitated. He remained in the vicinity through 0300 hr on 14 December 1985. At that time the wolf thrust against a cabin window and almost broke it. The residents threw a blanket over him, and brought him inside where he offered no resistance and failed to respond to attempts to feed him. He died a few hours later.

At necropsy, the lungs contained many firm nodules to 2.0 cm in diameter. The larger nodules were cavitated. Other lesions were not detected. Histologically, there were many focal concentrations of macrophages throughout the lungs. In areas of granulomatous inflammation there were many yeast-like round cells that had a refractile thin wall with a nucleus separated from it by a clear thin space (Fig. 1). The yeast-like structures were budding, and some were found within macrophages. These findings led to a diagnosis of pulmonary blastomycosis, which was confirmed by specific immunofluorescent staining of the yeast cells in the lung tissue (Kaplan and Kaufman, 1963).

In the serologic study, wolves were live-

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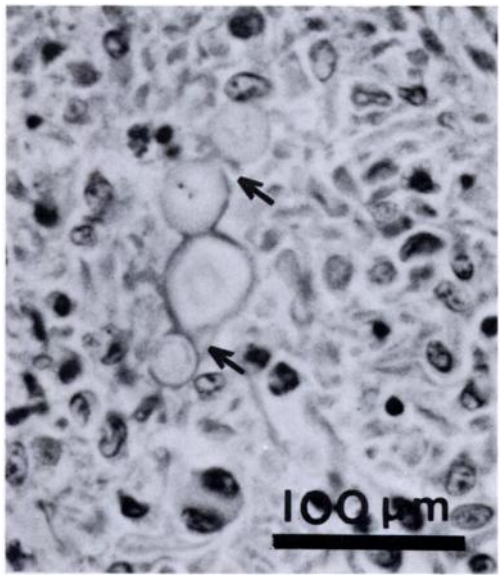


FIGURE 1. Wolf lung tissue showing granulomatous inflammation and budding (arrows) yeast-like cells.

trapped, anesthetized with ketamine hydrochloride and promazine hydrochloride, and blood-sampled (Mech, 1974). Merthiolate was added to the blood serum to give a concentration of $1{:}1 \times 10^4$, and the sera were frozen and tested at the Centers for Disease Control, Atlanta, Georgia. Immunodiffusion (ID) tests were conducted on all sera. Six of the sera were retested using the enzyme-linked immunosorbent assay (ELISA) technique (Turner et al., 1986). A positive antibody reaction to the specific A antigen in ID is considered diagnostic for blastomycosis. ELISA titers of 1:8 and 1:16 are considered presumptive evidence of blastomycosis, and titers $\geq$1:32 are diagnostic. Serum from 18 wolves, three coyotes (*C. latrans*) and one bobcat (*Felis rufus*) captured in Wisconsin during 1982–1985, and from 28 wolves caught in northcentral and northwestern Minnesota in 1982–1983 were tested for blastomycosis, and all were negative except an adult male wolf (021) from Douglas County, Wisconsin.

Wolf 6530, whose stored serum from a 4 September 1983 capture was tested in 1986, was negative by ID and had a titer of 1:8 by ELISA. Wolf 021 had a serum A precipitin and a diagnostic ELISA titer of 1:128. The animal weighed 32.7 kg when captured on 22 May 1982, showed no symptoms, and appeared healthy. His weight was close to the mean (33.0 kg) of 12 adult males captured in May. Wolf 021 was located 71 times in the 262 days before his collar was chewed off by other wolves about 8 February 1983 (Thiel and Fritts, 1983). While wolf 021 was monitored, his movements and activities were considered normal, and he appeared healthy on the 13 occasions he was observed.

Blastomycosis is enzootic in Minnesota (Schlosser, 1980), Wisconsin (Sarosi et al., 1979; McDonough and Kuzma, 1980), and infections or outbreaks were geographically concentrated in areas with sandy, acid soils and along waterways especially on or near impoundments (Archer, 1985).

Blastomycosis is not known to be contagious. Infection is thought to be associated with certain point sources in the environment. *Blastomyces dermatitidis* has been isolated from soil associated with a beaver (*Castor canadensis*) lodge in northern Wisconsin (Klein et al., 1986). Wolves prey on beaver and sometimes situate summer homesites near beaver-created flowages where perhaps they become exposed to the fungus. Because of the potential impact of blastomycosis on Wisconsin's endangered wolf population, continued surveillance for the disease is recommended.

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