

Isolation of *Blastomyces dermatitidis* from an Earthen Floor in Southwestern Ontario, Canada

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The first Canadian isolation of *Blastomyces dermatitidis* from nature is recorded. This was from the earthen floor of a petroleum filtering shed located in southwestern Ontario. A technician working in this environment became infected and was diagnosed as having systemic blastomycosis with meningeal involvement.

Nearly 120 cases of human blastomycosis were reported from Canada up to 1979 (12). Most were from Quebec, followed by smaller numbers from Ontario and the maritime provinces. Another 38 cases were recently recorded in Ontario, with a new endemic focus found to the north and east of Lake Superior where 20 of the patients lived (9). At Victoria Hospital, London, Ontario, since 1960 we have isolated *Blastomyces dermatitidis* from eight infected patients living in southwestern Ontario, as well as from skin lesions on two dogs. However, there have been no reports from Canada of the isolation of *B. dermatitidis* either from nature or from the homes or work environments of any patients. This report records a case of systemic blastomycosis in a 72-year-old male from Sarnia, Ontario, as well as the first Canadian isolation of *B. dermatitidis* from samples of earth obtained within the workplace.

The patient had worked for several years as a petroleum technician in a small, wooden filtering shed whose atmosphere was constantly dust laden with kieselguhr or fuller's (diatomaceous) earth. The shed had been erected about 8 years previously on a piece of unoccupied scrubland overgrown with weeds. When admitted to Victoria Hospital, the patient had a productive cough and complained of frontal headaches, recurrent fever, chills, and shortness of breath. He also had several draining, dark-red, boillike lesions 1 to 2 cm in diameter on his legs, thighs, and back and on the posterior aspect of his right arm. His left ankle was swollen and warm with a large, draining, purplish abscess above the heel. Yeast cells characteristic of *B. dermatitidis* were observed in 15% KOH mounts of sputum and exudates from lesions on the leg. Mycelial fragments were also found in KOH mounts of scrapings taken from several boillike lesions. Chest roentgenograms revealed a diffuse, reticular-nodular pattern to both lung fields, with a large calcific focus present inferior to the left hilum, although both pleural spaces appeared to be clear. *B. dermatitidis* from the sputum and from lesions on the left ankle, thighs, right arm, and back was isolated at 25°C on Sabouraud dextrose (Difco Laboratories) and blood agar media. Conversion of these colonies to the yeast (Y) phase was accomplished by using methods outlined by Kane (8) and Kane et al. (9). A diagnosis of systemic blastomycosis with meningeal involvement was made, and the patient was treated with intravenous injections of amphotericin B. After he received 1.5 g, his lesions healed and his lung picture improved. However, his fever, steady frontal headaches, and vomiting returned.

He was then treated intrathecally with amphotericin B and was finally discharged, having received a total of 2.25 g. There has been no recurrence of cutaneous, pulmonary, or meningeal infection with *B. dermatitidis*.

Earth samples were collected on three occasions from several areas near the patient's home and from the earthen floor in the filtering shed to determine whether *B. dermatitidis* was present in these environments. As a control, samples of kieselguhr were taken from bags stored in the shed. Additional samples of earth were taken for culture to determine whether other pathogenic (or keratinophilic) fungi were present in these areas (4). The methods used to collect and process these samples, as well as for the intraperitoneal and intravenous inoculation of mice with processed suspensions, were similar to those outlined by Denton and DiSalvo (6) and Ajello and Weeks (1). Mice were sacrificed after 6 weeks; upon autopsy and histological examination of periodic-acid-Schiff-stained sections of their lungs and livers, two mice that had been inoculated with suspensions of earth taken from beneath a worktable in one corner of the shed revealed invasion with large yeast cells characteristic of *B. dermatitidis* (8, 9). None of the mice inoculated with suspensions of earth taken from near the patient's home or with kieselguhr alone showed any sign of infection. Portions of infected lungs and livers were also macerated and cultured directly on Sabouraud agar medium which contained 0.5% yeast extract. After incubation at 25°C for 7 to 14 days, several colonies that showed the characteristic growth of the mold (M) phase of *B. dermatitidis* were obtained. Their identification was confirmed by standard means. No additional pathogenic or keratinophilic fungi were obtained from any of the other earth samples taken for culture.

B. dermatitidis is the second pathogenic fungus to be isolated from specimens of earth in Canada, the first one having been *Pseudallescheria boydii* (5). It has been reported (11) that yeast cells and mycelium of *B. dermatitidis*, when placed in soil in nature, may be lysed and soon disappear because they are unable to compete with the normal flora in the soil. Bakerspigel (2, 3) earlier demonstrated that many fungi, including *B. dermatitidis* and *Histoplasma capsulatum*, remained viable for up to 2.5 years when stored at room temperature in dry, sterile carriers, such as kieselguhr, loam, or sand. When they were wetted and subcultured onto agar media, their colony counts increased as the result of fragmentation of the initial inoculum during storage. A similar situation may have occurred in the filtering shed, where the fungus was present in the earthen floor, which was sprinkled with water at least

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once a day. Here, the fine particles of kieselguhr may have acted as vehicles for the aerial dissemination of mycelial fragments present in a small, concentrated area, thus creating an occupational hazard in the shed (11). In this connection, recent reports on infections in humans with *H. capsulatum* (7) and *B. dermatitidis* (6, 10) recorded findings that supported the hypothesis that these fungi exist in small, geographic foci (microfoci) in the soil. The owners of the filtering shed were informed of the hazards to technicians working in such an environment and also of a possible method by which this problem could be eliminated (1).

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