Blastomycosis Awareness and Yard Materials Management

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Composting facility operators should be aware the fungus *Blastomyces dermatitidis (B. dermatitidis)* can cause an uncommon but potentially serious infection known as blastomycosis. The fungus grows in moist, acidic soils with high organic material, particularly in wooded areas along waterways. Most of northern Wisconsin is "endemic" for blastomycosis. The Department of Health and Family Services (DHFS) identified ten counties with the highest rates of the disease (2000-2006) as: Menominee, Lincoln, Vilas, Forest, Oneida, Sawyer, Iron, Washburn, Shawano and Marathon.

Although blastomycosis has never been linked to composting, DHFS made a potential association between a 2006 outbreak and pine needles at a yard materials collection site located in the City of Merrill, Lincoln County, Wisconsin. The Department of Natural Resources (DNR) and DHFS cannot confidently say how to prevent *B. dermatitidis*, but certain practices may help.

Symptoms: Most people exposed to *B. dermatitidis* do not become ill or have only minor symptoms. However, the fungus can cause aserious, sometimes deadly, lung infection. The incubation period is approximately 45 days (ranging from weeks to months). People who experience persistent cough, muscle aches, joint pain, tiredness, chills, low grade fever, skin sores or unexplained weight loss, may have blastomycosis and should promptly seek medical attention. The first symptoms of the disease can be missed because it seems like other illnesses. Dogs, cats and other animals are also susceptible.

Sources: The fungus occurs naturally in certain unique environments, found in Wisconsin and other locations, including moist acidic soils overlaid with leaf litter. Weather conditions may cause spore release. Transmission is by inhalation of airborne spores after disturbance of contaminated material. An environmental link was first established in 1986 when the organism was isolated from riverbank soil. More recently, DHFS concluded that a pine needle pile at a small yard materials collection site may have been the source of a cluster of 21 cases in the City of Merrill in 2006. Whatever the source, the outbreak in Merrill was likely a unique set of circumstances and not predictable because *B. dermatitidis* growth is not well understood.

Requirements and Recommendations: This section provides a summary of composting rules and recommendations that may help prevent *B. dermatitidis* exposure. Complete rules for yard materials composting are in s. NR 502.12, Wis. Adm. Code. Although the rules apply to composting facilities with a capacity greater than 50 cubic yards, these rules and recommendations are also good practices for smaller composting and collection facilities. However, these recommendations are not directed at home composting.

1. Site Location

- Yard material composting facilities may not be located within a floodplain or within 250 feet of any navigable lake, pond, flowage, river or stream. The highest predicted areas of occurrence of the *B. dermatitidis* fungus were often in proximity to waterways, in both urban and rural environments, especially in north central Wisconsin where incidence of infection is high.

- Yard materials composting must be located 100 feet or more away from the property boundary. Wind direction and distance to occupied buildings should be considered when turning materials.

  A study of bioaerosols containing the more common (and less dangerous) fungus *Aspergillus fumigatus* (*A. fumigatus*) at composting facilities showed that spores usually decline to backgound levels within 660 feet (*Composting Science & Utilization,* 1994). DHFS believes the dispersal of *B.dermatitidis* spores, if present, would be similar to *A. fumigatus*.

2. Site Operation

- **Drainage:** Composting must take place on an area sloped sufficiently to prevent ponding. Avoiding a wet layer at the bottom of a windrow or pile may be particularly important to prevent *B. dermatitidis* growth.

- **Seed Destruction and Pathogen Reduction:** Composting must be managed to reduce pathogens (disease causing organisms). This also destroys seeds and plant parts (prevents spread of invasive plants and destroys fungus). Composting must reach 131 degrees F. For windrow composting, the temperature must be maintained for 15 days (do not have to be consecutive days) and the windrow turned at least five times during high temperature periods.

- **Turning and Moisture Addition:** The rules require that materials be kept "aerobic" (meaning with air). In general, an oxygen concentration of about 15 percent or more is recommended to ensure aerobic conditions. As mentioned above, the rules require some turning of windrows during high temperature periods. To keep windrows primarily aerobic in summer, yard materials may need monthly turning (more frequent when adding a significant fraction of nutrient rich material, such as grass clippings or harvested lake weeds). Wind direction and proximity to neighbors should be considered when turning materials.

  Rule requirements do not specify composting moisture content, except too much moisture creates anaerobic conditions, which is prohibited. Optimum moisture of 50 to 60 percent, along with sufficient oxygen, will minimize processing time (degradation as rapid as the nutrients present will support).

  If rainfall is not adequate, moisture is commonly added to accelerate degradation of yard materials. However, in areas with a high incidence of blastomycosis, it is **not** advisable to add moisture or to turn or disturb acidic materials (such as windrows or piles with a significant fraction of pine needles) during spring and fall. This is because blastomycosis in Wisconsin appears to be associated with spring or fall exposure following a rainy period. Spore release occurs in response to moist acidic conditions.

  Pine needles are acidic and do not compost well unless mixed with less acidic materials. Some facilities have found alternative uses for pine needles, such as mulch on berry farms and erosion control on road construction projects. In areas where *B. dermatitidis* is known to exist, it may be advisable to move pine needles only when dry.

  DHFS recommends that compost facility workers in endemic areas use dust masks when mechanically agitating/turning materials.

- **Transportation:** Light materials, including yard materials and compost, should be transported with a cover.

More Information: This fact sheet emphasizes and builds on rules believed likely to prevent or control mold growth in yard materials. It is not a complete list of all rules that apply to yard materials composting. Complete rules are in chs. NR 500, 502 and 518, Wis. Adm. Code listed at http://dnr.wi.gov/topic/Waste/Laws.html.

Publications about composting can also be found in the "Searchable Publication & Guidance System" available from http://prodoasext.dnr.wi.gov/inter1/pk_wm_doc_public$.startup by searching publication titles for the word "compost".

Questions about yard materials composting and collection as related to prevention of *B. dermatitidis* in northern Wisconsin can be directed to the following individuals at DNR: Ann Coakley (715-365-8960, ann.coakley@wisconsin.gov) or Gretchen Wheat (608-267-0557, gretchen.wheat@wisconsin.gov).

Questions about *B. dermatitidis* may also be directed to John Archer at DHFS (608-267-9009) or your county health department. Information is also available at the following Web sites:

- The Merck Manual of Medical Information http://www.merck.com/mmhe/sec17/ch197/ch197c.html
- Manitoba Health http://www.gov.mb.ca/health/publichealth/cdc/fs/blastomycosis.pdf

For general questions about composting and how to site a facility, call the waste management specialist at your local DNR office. A contact list is available at http://dnr.wi.gov/staffdir/dynamic/recycling.asp.

Contact 608/266-2111 or Waste.Materials@wisconsin.gov for further information.