MOLD IN THE LIBRARY

Mold is everywhere -- in the air, on surfaces, outdoors, indoors, on the cheese in our refrigerators. If it is everywhere, why should we be concerned about mold in the library?

Contact the Preservation Department if you find moldy collection materials. Preservation is equipped to identify and handle mold safely, and will respond as quickly as possible. This guide will help you understand mold, how it affects people and library collections, and what to do if you encounter it.

Contacts:

- Elise Calvi, call or email 24/7 -- 315-877-4831, ecalvi@indiana.edu; office -- 812-855-8464
- Preservation Department -- 812-856-0991

Health Concerns

Some molds pose health risks. Serious health problems caused by mold are rare, but exposure can result in respiratory problems, infections, and skin or eye irritation. Problems can come from both short exposure to a high concentration of mold and long-term exposure to low concentrations. Both active and dormant mold present health risks. The level of risk depends on one's general health, any pre-existing sensitivity to mold, and the concentration of the mold. Those with compromised immune systems or known sensitivity to mold should not have contact with active mold. For more information, see A Brief Guide to Mold in the Workplace, prepared by the Occupational Safety & Health Administration of the U.S. Department of Labor.

Effect of Mold on Library Materials

Active mold produces enzymes that allow it to digest paper and cloth, which eventually weakens and destroys these materials. Inactive mold does not damage library materials, but the spores can be spread through the library if affected materials are handled, and will become active if environmental conditions are conducive to their growth. The musty odor of mold may remain in library materials even after mold has been inactivated and removed.

Active and Dormant Mold

Mold spores need a favorable environment to germinate, or become active, grow, and spread. The most important condition mold needs to germinate is moisture. Most molds will germinate at 65% relative humidity (RH). It is also possible, however, for some molds to grow at lower RH. Higher temperatures and poor air circulation can accelerate mold growth. If collection materials get wet, they become more susceptible to mold growth. Water-damaged materials are at risk of mold growth while they remain wet, but they are also more susceptible to mold outbreaks later on, after they have been dried, if environmental conditions become favorable for growth.
It can sometimes be difficult to distinguish mold from dust, dirt, foxing, or cobwebs on collection materials. Mold can be almost any color. Mold usually has a recognizable musty odor, whether active or dormant. Active mold is soft and may smear easily, and it may be damp or slimy. Inactive mold is dry and powdery, and brushes off. Under magnification, it is easier to distinguish mold from dust and dirt. In the early stages of mold germination, it forms hair-like filaments in webs, then as it matures it develops a bushy appearance.

**Preventing Mold Outbreaks**

It is not possible to create an environment free of mold spores. Dormant spores are everywhere, therefore the only dependable way to avoid mold problems is to control the environment so that mold cannot become active. Control of the environment means maintaining moderate temperature and RH (never above 65%), good air circulation, keeping collections and collection storage areas clean, and not bringing new collection materials with mold into the library. It is also very important to keep books and other paper-based collections from getting wet, and to treat wet books as an emergency, since mold is likely to grow on such materials within 24 to 48 hours. Roof leaks and plumbing failures can result in library materials getting wet, so proper building maintenance is also necessary to avoid mold problems.

**Procedures to Follow if Mold is Found in the Library**

1) **What to Do With Moldy Items**

The first concern with mold-contaminated collection materials is health and safety, so if you encounter a moldy collection item, avoid handling it. Isolate the moldy material by putting it into a plastic bag, tied closed, wash your hands, and bring the item(s) to Preservation or notify Preservation staff right away. Do not send suspected moldy items via Library Mail Services.

If you are unpacking a box of gifts, for example, and it smells moldy or you see something that appears to be mold, close the box back up and move it to a location away from people, then contact the Preservation Department.

The Preservation Department is equipped to review and handle moldy materials. Adequate protection includes wearing a properly fitted respirator with HEPA (high efficiency particulate air) filters, disposable plastic gloves, and eye protection. Once materials are in the Preservation Department, staff can examine them safely in a vented fume hood.

2) **What to Do If There is a Mold Outbreak**

The first concern with a mold outbreak is health and safety. If there is a mold outbreak in the library (affecting a whole area of the building or collection) such as could occur following a water disaster, or a failure in the HVAC system that results in high temperature and high relative humidity, the first step is to notify Library Facilities (5-9299). After hours, notify the Physical Plant (5-8728).

**NEXT**
The mold affected area should be closed off so that staff and patrons cannot enter. Doors should be
closed, plastic sheeting hung to separate affected from unaffected parts of the collection. If possible, the air circulation should be reduced so that it does not flow from affected areas into unaffected areas.

After these first response steps are taken care of, the next concern is to:

- Identify the cause of the outbreak, and
- Inactivate the mold by changing the environmental conditions.

Locate the source of high humidity. Likely causes are leaks from windows, roof, or pipes, or malfunctions in the heating and cooling systems (HVAC) that result in high RH. Problems can also develop within the HVAC system, due to a malfunction or lack of maintenance, and be spread through the building. Prime areas for mold problems to form are heat exchange coils, drip pans, and duct work.

Lower the humidity and increase the air circulation. The goal is to change the environmental conditions so that mold will be inactivated. Monitor the temperature and relative humidity regularly, and aim to get the RH below 50% and the temperature as low as possible, but at least down to 70 degrees F. Possible methods for reducing the RH and temperature are to lower the settings of the HVAC system, use fans to increase air flow, open windows if the air outside is colder and drier than indoors, or use dehumidifiers. Remove water-soaked items from the area, if present, such as ceiling tiles, upholstered furniture, and carpeting.

Retention of Mold-Affected Materials

In some cases, the best decision for mold-affected items in the general collection without artifactual value is to discard them. If their information content is important for the collection, finding replacements is often a better course of action than attempting to clean them. When the mold damage is limited to covers or just a few pages of a book, the book can often be saved by rebinding and replacing the few affected pages. Rare and unique materials that have become moldy, however, usually are worth the cost and effort to remediate. For potential gifts, only the most rare or scarce materials are worth the difficulties presented by mold. Cleaning moldy materials is time consuming and also carries some level of risk for staff who do this work. In addition, materials that were once moldy are always susceptible to future mold blooms to a greater extent than other materials, and must be stored in appropriate environmental conditions and monitored.