

Guidelines for Managing Mold Contamination

The Weissman Preservation Center is available to assist Harvard's libraries in identifying and selecting disaster recovery products and services. Call 617-495-8596. Members of the HCL Library Community may contact Conservation Services, Widener Library, 617- 495-3494.

For information or assistance with recovery of water-damaged library materials from the Harvard collections, please contact a member of the Library Collections Emergency Team, 617-240-2500.

Evening/Weekend Contacts:

Library Collections Emergency Team cell phone: 617-240-2500, or University Operations Center, 617-495-5560.

NATURE OF MOLD

Mold and mildew are words that refer to more than 100,000 species of fungi. Mold spores are present everywhere in our environment, generally in a dormant state where they do little damage. Spores require moisture to become active. They do not require light.

When water or high relative humidity provides the necessary moisture, dormant spores will germinate, grow fine web-like structures, and eventually produce fruiting bodies that release more spores. Most molds will germinate at 65 percent relative humidity. Increases in temperature can speed the growth rate of active mold.

IDENTIFICATION OF MOLD

Mold blooms in many colors and is often confused with dust, dirt, foxing, or cobwebs. Both active and inactive mold can have a distinctive smell, which most people describe as musty.

- *Active mold* in the early stages of a bloom has hair-like filaments in webs, which develop a more bushy appearance as the bloom matures. This is more easily seen under magnification. Active mold is soft and may smear when touched with a fine brush. It may also be slimy and damp.
- *Inactive mold* is dry and powdery and will seem to brush off materials readily.

HUMAN HEALTH RISKS

Some molds that grow on library collections pose a health hazard to people. Mold spores are introduced to the human body by inhalation and through small breaks in the skin. Although serious consequences are rare, active mold can cause respiratory problems, skin and eye irritation, and infections. Such reactions may result from short-term exposure to

high concentrations of mold or long-term exposure to low concentrations. Mold poses the same potential health hazard whether active or dormant.

The degree of risk from exposure to mold is determined by a person's general health and pre-existing sensitivity to mold, as well as the concentration of the mold bloom. Staff members with compromised immune systems or known sensitivity to mold (e.g., allergy to penicillin) should not have contact with active mold.

BIOHAZARDS

Mold does not present a biohazard but if it is accompanied by evidence of biological waste contamination, the situation should be reported immediately to the Harvard University Office of Environmental Health and Safety (617-495-2060 in Cambridge; 617-432-1720 in the Longwood Medical Area).

COLLECTION RISKS

Active mold produces enzymes that can digest organic materials such as paper and book cloth, weakening or destroying them. Colorful blooms can cause stains that cannot be removed. Active mold poses an immediate risk and should be addressed without delay.

Inactive mold poses no immediate danger to collections, except that it can be spread through handling and air currents, and will readily bloom if propitious environmental conditions occur.

MANAGEMENT STRATEGIES

1. Handle carefully all materials that are suspected of mold contamination. If possible, sequester contaminated materials from library staff and collections immediately.
2. Work in an area with good ventilation and wear gloves that do not contain natural rubber. Well-fitted goggles can help to prevent eye irritation. If possible, inspect materials outdoors or under a fume hood.

Ordinary dust masks do not provide adequate protection against inhalation of mold spores. Respirators are effective, but they should not be used unless the mask has been fit-tested and properly maintained.

3. Examine materials just enough to determine if the mold is active or inactive. For books, look particularly at the covers, edges, and endsheets; and inside the spine hollow. Take precautions to avoid inhaling or touching mold spores.
4. Consider carefully the significance of the affected materials and whether they can be discarded. Materials that have sustained mold damage will never regain their original appearance and will be especially susceptible to mold bloom in the future. It may be wise to try to identify duplicates in the Harvard collections or obtain replacements if they are available, rather than to salvage moldy materials.

Materials earmarked for discard may be enclosed in zip-lock-type plastic bags and discarded in the regular trash.

5. If moldy materials must be retained, keep them isolated from other library holdings, in environmental conditions inhospitable to mold growth. Active mold will return to a dormant state and inactive mold will remain dormant as long as it is denied the moisture required for blooming. If mold is active and no clean dry storage space is immediately available, box the infected materials, wrap the boxes in plastic, and freeze them until arrangements can be made for drying and cleaning.
6. Restore stacks and/or processing areas to cool, dry conditions as quickly as possible, and before library materials are reintroduced.
 - Dry, remove, or control sources of excessive moisture (e.g., install dehumidifiers, remove damp rugs).
 - Reduce relative humidity to below 50% (30% is ideal).
 - Reduce the temperature to 70 degrees Fahrenheit or lower. (Until RH is reduced, the lower the temperature the better.)
 - Increase ambient air circulation.
 - Clean shelving with disinfectant.
7. Once materials are very dry and mold is dormant it is possible to remove many (but not all) spores. Clean contaminated materials under a fume hood or outdoors using a vacuum cleaner with HEPA filtration. Staff from any Harvard library may use the equipment in the Collections Conservation Laboratory in Widener Library by calling 617-495-3494 or in the Weissman Preservation Center by calling 617-495-8596.

Salvaged materials must always be stored under appropriate conditions, or a bloom may reoccur.

ADDITIONAL READING

Guild, Sherry and MacDonald, Maureen. *Mould Prevention and Collection Recovery: Guidelines for Heritage Collections*. Ottawa : Canadian Conservation Institute, c2004. Technical Bulletin, no. 26

Available from <http://preserve.harvard.edu>
http://preserve.harvard.edu/guidelines/mold_contamination.pdf

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