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MOLD PREVENTION

Kathleen Parrott, Ph.D.
Professor of Housing, Virginia Tech

Virginia Cooperative Extension has three publications to help you deal with **mold** in your home:

- *Mold Basics:* What is mold? How does it grow? What are the health concerns?
- *Mold Prevention:* Can we prevent water problems in the home? How do we keep water problems from becoming mold problems?
- *Mold Remediation:* What do we do if we have mold in our homes?

Can We Really Prevent Mold Growth?

Molds are everywhere in the environment. They are a natural part of the ecosystem and we can not eliminate them completely. The problem is when there is an excess of mold growth in our buildings and the mold growth damages building materials or threatens our health. To prevent mold problems in our homes, we need to understand how mold grows and to learn to control the conditions that lead to mold growth.

In order to grow, molds require:

- A food source.
- Appropriate temperature.
- Oxygen.
- Adequate moisture.

Molds digest *organic matter* as a food source. This includes many materials found in our homes, including wood, paper, textiles, plants, and food. Therefore, there is always a food source for molds in our homes, including many of the materials that we use to build and furnish our homes.

Molds typically grow at *temperatures* ranging from about 40 degrees to 100 degrees Fahrenheit. Therefore, the temperature in our homes is usually adequate for mold growth. Of course, most places in our homes have an adequate *oxygen* supply for mold growth.

This leaves a *moisture source* as the last requirement for mold growth. Molds require a high level of moisture to begin growing. Most molds require a surface moisture or humidity level of 70% to 90% to start growth. Most of the time, the materials or air in our homes does not contain this amount of moisture. However, when there are water leaks, uncontrolled condensation or humidity, flooding or weather damage, or other water problems, then moisture levels can get high enough to support mold growth. Therefore, **to control mold growth in our homes, we must control excess moisture and water!**

Let's emphasize the first important point: *when materials in our homes get wet, they can get moldy.*

Mold growth can begin very quickly. Some species of mold can begin growing in only a few hours. We must assume that if materials in our home – walls, carpet, furniture, flooring, or ceiling tiles – get wet, mold growth can be expected within **24 to 48 hours.**

Let's emphasize the second important point: *wet materials in our homes will get moldy very quickly!*

Now we have learned the third important point: *water problems = mold problems!* Therefore, the key to preventing mold is preventing and quickly solving water problems in our homes.

How Can I Prevent Water Problems in My Home?

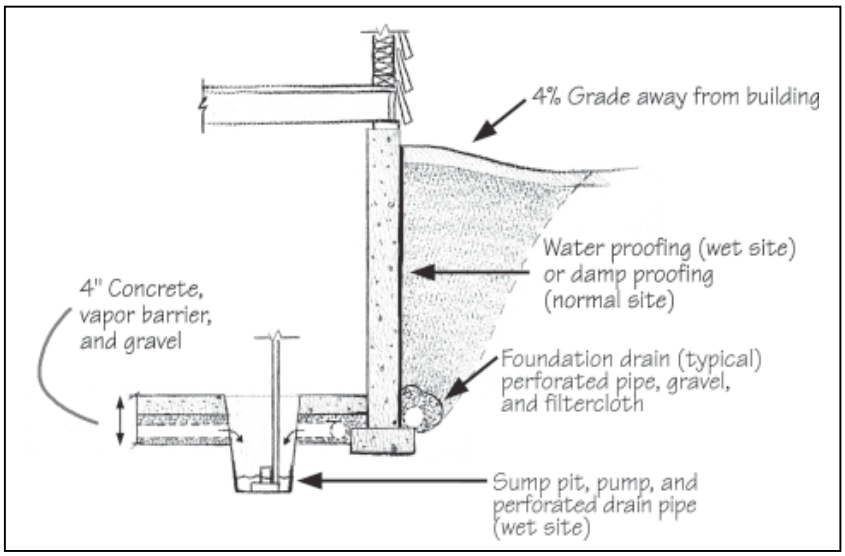
A well-maintained home is less likely to have water problems than one that is in poor repair. If you practice regular preventive maintenance around your home, you are likely to spot potential problems before they become big problems. Preventive maintenance also helps protect your investment in your home and makes it a safer, healthier, and more pleasant place to live.

Preventive maintenance is practiced in several ways:

- Take care of needed repairs quickly while they are minor and before neglect can cause damage to the structure of the home. This can be as simple as replacing a washer on a dripping faucet or as major finding and replacing a leak in roof flashing.
- Maintain the home and its systems on a regular schedule. For example, trim shrubbery, clean dehumidifiers, and replace a worn flapper valve on a toilet. Keeping the home and its parts in good working order reduces the likelihood of a water emergency.
- Once or twice a year, do a home inspection. Many people choose fall and spring as a good time for a home inspection, as they get ready for seasonal changes. Look for signs of potential water problems, such as damp spots, worn roof shingles, or water stains. Note where regular maintenance and upkeep needs to be done in the future, and put it on your "to-do" list. Follow through with your home maintenance tasks!

As you practice preventive maintenance on your home, there are some areas that need particular attention in order to minimize the likelihood of water and moisture problems. Here are some suggestions.

- Begin with the exterior of your home and make sure that water is directed away from the foundation of the home. Check that:
  - The land slopes away from the foundation.
  - The roof drainage system, such as gutter and downspouts, takes water away from the walls and foundation.



- Landscaping is clear of the foundation so that it does not hold moisture against the building exterior and allows ventilation around the foundation.
- Sprinklers do not water the building.
- Your sump pump (if you have one) operates properly.

- Control the humidity inside your home. A relative humidity range of 40% to 50% is comfortable for most people without leading to potential condensation problems.
  - Do you use exhaust fans when showering – always?
  - Do you use an exhaust fan when cooking on a range; especially if you use a gas range? Did you know that water vapor is a by-product of gas combustion?
  - Have you eliminated these moisture sources from you home: lots of house plants, firewood stored inside, clothes being dried inside, unvented combustion heaters (like kerosene heaters, which can produce large amounts of moisture), or *humidifiers?*
  - If your home has a crawl space, is the ground covered with a moisture barrier, such as heavy plastic?

- In addition to limiting sources of moisture and humidity, there are some management practices in your home that can help prevent mold.
  - Insulate any exposed cold water pipes and cold air ducts so that condensation will not form on the pipes and ducts.
  - Avoid carpet on concrete basement floors as this is likely to become a great place for mold.
  - Allow space for air circulation between furnishings and window treatments on exterior walls.
  - Vent all combustion appliances to the outside.
  - Do not overcool you home, if you have an air conditioner, as this can lead to more condensation, as well as using lots of energy!
  - Consider using dehumidifiers in trouble spots if other moisture control measures do not work.

I Have Water in My Home – What Can I Do to Prevent Mold?

Water in your home – where it is not supposed to be – can be a scary proposition. Don't panic. Deal with the water problem, quickly, calmly, and efficiently – and reduce the likelihood that you will have a mold problem in the future. Good advice: turn off the water supply first, and then deal with locating the leak and fixing it.

It is possible that your homeowner's insurance may cover some cost of repairing damages from a water leak. Take pictures of the water leak, and of any structural or material damage to the home.

If your water problem is from a plumbing leak, your first priority is to find the leak. Sometimes this is easy – water coming from a faucet or pipe. Sometimes it is not so easy – a water stain on a ceiling. Keep in mind that water seeks the lowest point, and that it will sometimes follow a joist, duct, or pipe for quite a distance from the source of the original leak. Good detective work is sometimes needed. Professional help may be necessary. Once the leak is located, repair it.

Once the source of the water leak has been identified and repaired, wet building materials must be dried and/or removed. The extent of the water damage and the type of material will determine the best solution. The goal is to dry out materials quickly, before mold can start growing.

Ventilation with fans and use of dehumidifiers is helpful to dry out building materials. Keep in mind that water may have spread such as underneath carpeting or behind wallboard.

Cellulosic building materials – wood, paper, natural fiber textiles – are particularly susceptible to mold growth. In addition, these materials tend to absorb moisture. Therefore, building materials, such as paper-faced gypsum wallboard, particleboard, and carpet are sometimes better replaced if they have gotten very wet, or have been wet for a period of time.

What if My Water Problem Is From a Flood?

Cleaning up after a flood can be heart breaking. Salvaging personal possessions and saving a home can be the priority and you might not think about mold prevention. However, mold is a water-related problem that will come along after a flood if immediate prevention steps are not taken.

Mold prevention after a flood is similar to that of any water problem in the home, except that it is complicated by the following factors:

- Flood water typically take a period of time to recede, therefore flooded buildings are wetter, and may have been wet for extended time periods. Mold growth is likely to be active before residents can begin clean-up.
- Flood waters typically contain run-off from many sources, therefore the flood water is dirty, possibly toxic. This makes clean-up more difficult, and also provides more food sources for mold growth.
- Flooding can involve extensive damage to the home and its possessions. Therefore, the cleanup and repair of the home is a long and extensive process, in addition to dealing with mold issues. Expert advice, and perhaps professional help, is needed. (Consult the reference list with this publication).

What if I Am Planning a New Home or Renovating My Current Home? Can I Minimize My Chances of Water and Mold Problems?

A well-planned home can reduce the chance of water problems, and thus mold problems. Attention to detail in planning the building site, foundation, construction techniques, mechanical systems, and choice of materials reduces the risk of water and mold problems. Consult experts knowledgeable about quality housing design and construction to help you plan your home to minimize water problems.

Here are some important tips and recommendations to consider.

Building Construction

- Choose a site that is well drained and out of a flood plain. Look for the ability to slope land away from the building foundation and to provide good foundation drainage.
- Regardless of the type of foundation chosen, it should be designed to prevent moisture migration from the soil into the foundation floor or walls. Place a 4-inch layer of gravel or stone, topped by polyethylene, beneath the basement slab. Drain tile at foundation footings is recommended.
- Roof overhangs and a roof drainage system, such as gutters and downspouts, should be used to control roof drainage away from walls and the foundation.

- All building joints, windows, and wall penetrations should be properly flashed to shed water.
- Select high performance, energy efficient windows, such as with low-emissivity glass, to reduce winter condensation problems.

Building Systems

- Make plumbing accessible in case repairs are needed, including avoiding plumbing in exterior walls and concrete slabs.
- Install secondary water shut-offs for all plumbing fixtures and water-using appliances – in case of leaks and emergency repairs.
- Install floor drains under water using appliances, such as clothes washers.
- Provide exhaust ventilation wherever there are moisture sources, including kitchen, bathroom, and laundry.
- Size cooling systems correctly for maximum dehumidification.
- Insulate all cold water pipes and cold air ducts to prevent condensation.

Building Materials

- Consider using gypsum wall-board without paper facing.
- Before installation, store all building materials under roof, protected from weather and off the ground.
- Inspect all building materials, before installation, for excess moisture and mold.

How Can I Learn More About Molds?

Virginia Cooperative Extension has two additional fact sheets on mold that you can read:

- MOLD BASICS
- MOLD REMEDIATION

You may also want to consult the following references (current as of 1/09):

- Environmental Protection Agency (EPA) at www.epa.gov/mold. In particular, consult:
  - *A Brief Guide on Mold, Moisture and Your Home.*

  For more detailed information, consult:
  - *Mold Remediation in Schools and Commercial Buildings*
  - *Mold Course: Introduction to Mold and Mold Remediation for Environmental and Public Health Professionals.*
- American Industrial Hygiene Association at www.aiha.org . Select the mold link for:
  - *The Facts about Mold* (consumer brochure)
- Federal Emergency Management Agency (FEMA) at www.fema.gov. This web site has fact sheets and case studies about mold clean-up and prevention after flooding, hurricanes and other weather disasters.
- Building Science Corporation at www.buildingscience.com/resources/mold. Search the data base for detailed information on moisture and mold control in buildings.
- New York City Department of Health and Mental Hygiene: Guidelines on Assessment and Remediation of Fungi in Indoor Environments at: http://home2.nyc.gov/html/doh/downloads/pdf/epi/epi-mold-guidelines.pdf. These guidelines are generally considered the standard for remediation and mold clean-up.

Drawing source: *Durability by Design: A Guide for Residential Builders and Designers* (May 2002). www.pathnet.org

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