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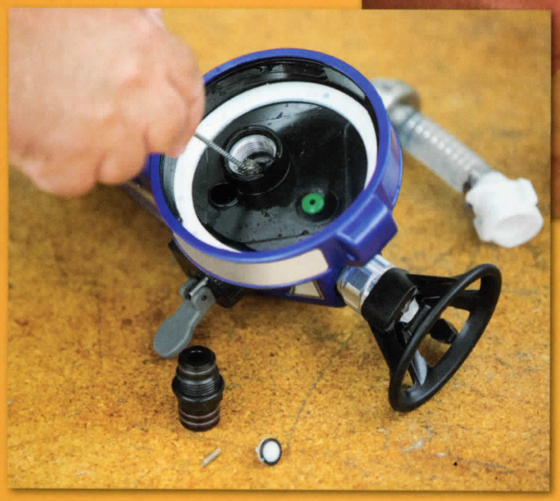

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The Secret Jungle:

Safe Navigation of Indoor Mold

Imagine you have been working at your new office for the past six months. It has been spring and summer, and the air conditioning in your building is not quite up to the job, making your corner of the office slightly cooler than the east side. Some of your co-workers complain, but you don't see the big deal. The whole office seems comfortable enough to you. You do start to notice, however, that you seem to be coming down with colds more frequently than usual. It was a rough cold season last winter, so at first you don't think anything of it. But then as spring turns to summer and you keep coughing, you start to worry that something more serious is wrong.

Several of the others, especially on your side of the office, have been making the same complaint. One day you notice that the wallpaper near the lunchroom has begun to peel, and you turn the peeled section back and see that the inside surface of the paper is black and has a musty smell. A call to a health inspector leads to removal of a larger section of wallpaper, revealing that the entire back section of wallpaper in your corner of the office is sporting a healthy colony of "black mold" *(S. chartarum)*, growing in the moist space between the wallpaper and the drywall right where the cool air comes into the office.

Mold Basics

As undesirable as it seems to us, mold is an integral part of nature. It travels through the air in the form of microscopic spores and lands wherever there is moisture and organic material (such as on fallen leaves on the forest floor), breaking down the organic material and recycling it back into the ecosystem. Without mold, the ecosystem would grind to a halt.

The trouble for homeowners is that their home is not designed to be an ecosystem. If conditions are right, there is nothing within the controlled indoor environment that will check the spread of mold and it will proliferate, decomposing whatever it lands on and sending an ever-increasing density of spores into the air. A high density of mold spores can create a myriad of health complaints, including respiratory issues and skin irritation, while the mold blooms themselves cause permanent aesthetic and structural damage. The bad news is, since mold is such a common presence in nature, it is impossible to keep mold spores from entering a house or building. The good news is, if mold is going to proliferate to the point that it becomes a problem, it needs specific conditions. The key to controlling mold is to control those conditions.

What Does Mold Need?

Mold is a fungus, which genetically speaking is actually more closely related to an animal than to a plant. Fungi breathe oxygen and consume organic compounds just like animals, breaking down the energy that was originally introduced to the ecosystem through the capture of sunlight by plants. What makes fungi unique from animals is that they do not ingest their food, capturing it inside their bodies; instead they release enzymes into the surrounding environment that break down the organic material there, and then reabsorb the broken-down nutrients through their cell walls. This can be conceptualized as the fungi having their stomachs on the outside. Because they do not have to internally digest their food, molds can eat many substances that animals cannot. This includes many common household substances such as drywall, wallpaper, carpet, fabric and even household dust, which contains a high concentration of microscopic organic particles like dead skin cells.

In order for their external stomachs to function properly, however, molds need moisture. The amount of "free water" present in a building material that is available to the mold for chemical circulation is known as "water activity" and is ranked on a scale from 0 to 1. While different molds have different requirements for water activity and their requirements vary based on temperature and type of building material, most molds cannot grow in any circumstances if the water activity drops below 0.65. The key to controlling mold growth, therefore, is to control moisture.

How Does Moisture Enter a House?

Moisture can enter the home directly through leaks or indirectly through condensation and humidity. Controlling leaks that may introduce moisture into

your home and using techniques to reduce humidity and eliminate condensation are the best protection against the spread of mold.

Top Sources of Mold-Growing Moisture

- External leaks: Leaks from the outdoors are caused by inadequate drainage off of either the roof or the surrounding landscape. Failing roof shingles or caulk and unclean gutters are the top reasons that roofs collect water and begin to leak. Inadequate grading of the landscape to channel water away from the structure is a cause of leaking in basements, crawl spaces and foundations. Slow, steady leaks provide ideal conditions for mold growth, as do leaks that deposit a large amount of water that takes a while to dry.
- Internal leaks: Leaks from indoor plumbing or HVAC systems can cause moisture to slowly and steadily be deposited in out-of-the-way areas that homeowners may not immediately notice. As such, they are a primary cause of moisture damage and resulting mold growth in the home.
- High humidity: Especially when temperatures are warm, or when appliances that increase humidity are running (such as showers, clothes dryers or heaters), the humidity in the indoor air can rise to the point where surrounding building materials will begin to absorb water. If humid conditions persist, the substrates will become moist enough for mold to grow.
- Poor ventilation: When air does not circulate, any moisture absorbed by a substrate is unlikely to evaporate back into the air. Poor air circulation therefore contributes to damp conditions, especially in out-of-the-way places like closets, basements, attics and other storage areas.
- Condensation: On certain areas of the home such as windows, HVAC vents, pipes and appliances, there may be a sudden cooling of surface temperature that causes condensation. When condensation occurs, water is pulled out of the air and beads up on the surface, eventually collecting in drops and soaking into the substrate.

How to Fight Back

Good info to pass along to your clients with mold issues

- Keep water draining away from the home: Regularly inspect your roof, gutters, crawl space or basement drainage areas, and landscaping to ensure that water is draining away from your home.
- Catch leaks early: Regardless of whether it is an internal or an external leak, if you can catch it and dry it up within 24 hours, you will usually not run the risk of growing any mold. Regularly inspecting out-of-the-way areas such as underneath sinks and storage areas is a good way to ensure that leaks don't gain momentum in secret.
- Vent moisture-producing Appliances: Whenever possible, arrange moisture-producing appliances (such as the dryer

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