

# Can Mold Give You Headaches?

You bet it can: When it comes to this pervasive fungus, a little can go a long way toward wrecking a job

by Mac Pearce

**I**f you want to fight or — even better — prevent a mold problem, it helps to know the enemy. So let's start there.

Molds are part of the fungal kingdom, which also includes mushrooms, wood rots, and yeasts. Although many have a physical resemblance, fungi aren't

plants. They don't use photosynthesis to make food out of sunshine. Instead, fungi are decomposers, turning used-up living material into dirt. When the job is done, they leave few traces of their own presence, but the stuff they have digested winds up as fertile ground for new life to grow out of.

Fungal growth usually begins with a fertile fungal spore on a damp, digestible surface. The spore absorbs moisture, then secretes it back out as a liquid solution loaded with digestive enzymes. These enzymes transform the surrounding environment into a meal. The nutrients are then absorbed back into the spore, which begins to grow by extending feeding tubes called hyphae. Filamentous fungi like molds and rots build a network of these feeding tubes called a mycelium. The mycelium will continue to expand as long as food and water are available. Once the colony is mature it can produce spores.

Fungal spores are usually produced in fantastic numbers. A thriving mold colony can be covered with millions of spores per square inch. Wood rots produce their spores in fruiting bodies, commonly called mushrooms. A hand-sized portobello mushroom in the produce section of the grocery store may contain



## Can Mold Give You Headaches?

billions of spores. When the spores are disturbed, they are released into the air. Once airborne, they are small enough to remain suspended for hours before settling. They surf along on any moving air. Mold spores growing outdoors can rise a mile into the sky in a matter of minutes in warm summer updrafts.

It is the mobility of fungal spores that makes them such pesky indoor air contaminants. Careless handling of moldy material can release clouds of particles into the air, rapidly converting a local mold growth into a widespread general

problem as the spores land and become a potentially irritating component of the settled dust.

The health effects of exposure to fungal spores depend on how sensitive the exposed person is. People who have allergies to mold can be truly miserable inside a moldy building, while nonallergic individuals may feel nothing at all. Toxic mold scares have gotten lots of coverage in the media, but most of the poisonous properties of the fungi have been discovered in animal feeding studies.

Whether toxic mold can poison occu-

pants or not, one sure thing is that mold growth is deadly poisonous to property values. When mold problems come to light a property is typically rendered unsellable. Mortgage payers are therefore, by definition, “sensitive” to mold.

What follows are some mold cases that caused serious aggravation — though not necessarily to anyone’s health. Each of these situations was entirely preventable. And needless to say, in each case the cost of doing things properly in the first place would have been a small fraction of the repair cost.

## Why You Shouldn’t Exhaust the Bath Fan into the Attic

A plumber stuck his head up through an attic hatch and saw a disconnected flex duct — a bath exhaust pipe — lying in a bed of fiberglass insulation. Immediately downstream from the duct was a small patch of blackened roof sheathing. So he closed the hatch, climbed down the stepladder, and announced that there was a mold problem in the attic and that he wouldn’t do any work until the problem had been resolved.

The homeowner called his insurance company, who hired a local environmental firm to send out a certified industrial hygienist to assess the problem. He collected a sample from the moldy wood and identified it as *Stachybotrys chartarum*, the infamous “toxic black

mold.” To correct the problem, the hygienist recommended that all the wood framing and decking in the attic be abrasive-blasted with dry ice and all the loose-fill fiberglass insulation be removed and replaced. The homeowner received an estimate of more than \$20,000 to have the work done. Frightened, he called his builder, who contacted our state builders association, who referred the homeowner to me. The owner called and described the problem, noting that all he could see was a small patch of mold and wondering if the recommended repairs might be a bit over the top. He asked me to come down and take a look.

I arrived early in the morning, before the day got too hot (attic work in the summer can be unbearable). As the owner had said, there was only one visibly moldy spot in the attic, where the bath vent had been pointing. I collected tape lifts and contact plate samples from the suspicious black spot, and from unstained wood framing and sheathing a few feet away from the problem area and at several other locations around the attic. I also collected samples of insulation from directly under the mold spot and other areas.

I examined the samples in my lab and discovered that the only measurably moldy area in that attic was the one little black patch; the rest of the samples were clean. I happened to be acquainted with the CEO of the involved environmental firm, so I called him to discuss my findings and suggested that he ask his guy



## Can Mold Give You Headaches?

to consider modifying his recommendations. He wrote back to say that his man “stood by his report” — making me think the industrial hygienist was more certifiable than certified.

In the end, the homeowner decided to follow my recommendation: He scrubbed off the moldy patch with a sponge full of bleach and that was the end of the matter. He spent 50 cents instead of 20,000 dollars.

The fact is, environmental reports can cause as many problems as they solve. It's important to sort out opinions from facts. A negative mold report can be the kiss of death to a property sale, particularly since disclosure rules require that such reports be shared, even if the conclusions are ridiculous. Don't be afraid to ask for a second opinion if you think the opinions of the “expert” are questionable.



As a final thought, always make it a point on your jobs to get up into the attic and confirm that all the exhaust ducts are properly connected.

## More Moldy Roof Sheathing

The deal was done: A 5-year-old house was being sold to a second owner for \$600,000 — contingent upon a home inspection. The buyer's expert climbed up into the attic, shined his flashlight at the gable end, and saw a stained area. He cried “Mold!” and the deal was canceled. The seller was saddled with a damning report that rendered his property unsellable. He called and asked me to come out and take a look.

This time there was no avoiding an August afternoon visit. I climbed up into the attic, which I measured at 140°F. I teetered across the trusses, pouring sweat and getting groggy. When I reached the stained gable end, I observed a couple of neat, 2-by-4-foot rectangular patches of discolored OSB sheathing. Again I collected tape lifts and contact plates from the stains and from adjoining sheathing and framing, and took lots of digital photos.

It is said that nature abhors a straight line, and in this case the shape of the dark patch was an important clue. What would make fungus grow in such a neat shape?



The explanation was simple: It wasn't mold at all. My friends at the wood products lab at the University of Minnesota readily identified the growth as sap-stain

fungus, a common cosmetic blight on OSB, especially when the wood mix is rich in birch and poplar.

There was in fact no way that a fungus



## Can Mold Give You Headaches?



could have grown in this area of a blazing hot attic. The neat straight borders told the tale: The panel had gotten wet while sitting outdoors in the lumber pile, partially covered by other pieces of wood. It was installed with the stain already on it — evidence of a careless carpenter, not a moisture or mold problem in the home.

My culture showed the fungus to be dead, no doubt cooked long ago by the searing attic heat. There certainly was no indoor air quality problem related to this stuff. There was no blanket of spores waiting to be released, just a small patch of slightly flaky OSB that still maintained its structural strength. The needed repair

was to apply a quart of antimicrobial white paint — not to “cure” the problem, but to avoid panicking the next inspector.

The take-home message is that you need to avoid installing moldy materials. I have had similar cases involving moldy dimension lumber. In one episode, the customer came by the job site and found green spots all over the framing. The lumber had been shipped damp, wrapped in vapor-retardant plastic, and had gotten moldy on the train ride to the lumberyard. The customer wanted everything removed. The builder balked at the cost of disassembly and suggested a bleach treatment instead. In the end, no matter

how it turns out, no one is really happy.

I recall once following a truck loaded with pallets of unprotected gypsum board, roaring down the highway in a driving rainstorm. When materials like that arrive on a job site, someone should take time to inspect them for mold and moisture damage. Use a simple, inexpensive hand-held pin moisture meter to evaluate the moisture content of both lumber and drywall; if the stuff is wet, send it back. No one likes delays, and no one likes returning products, but in the end it's quicker and cheaper to make sure that you are receiving good-quality materials.

## Don't Forget Dry-In

A big, fancy lake home was being built for a wealthy client. Due to a scheduling mix-up, the wall cavities were insulated and the drywall was installed on the main floor before the roofers arrived. After several days of rain, the place was pretty much in ruins. The customers paid a visit to the site and found their million-dollar dream home had become a nightmare. They wanted everything torn out.

The builder hired me to come out and assess the situation. He hoped that I could explain to his customers that no harm had been done. I'm afraid to say he was disappointed: All the drywall was damp around the edges, and the insulation and the sheathing behind it were damp. The wall cavities smelled musty and the

studs were developing telltale coin-sized green spots. At this stage, there's no miracle fix. Flooded property can be successfully restored as long as drying begins immediately. In this case, the partially completed building had been allowed to sit wet for over a week. The weather had been damp and overcast, so there was little natural drying. Powerful dehumidification could have removed the moisture, but not until the building was sealed up. Yet when I got there, they were still waiting for the roofer.

I often hear builders say that time is money, but sometimes you just have to say no. Getting things done right is important, but sometimes getting things done in the right order is most critical.

### A Conspiracy of Sun and Rain

**I**t was a 12-year-old home in a suburban development. The kids were shooting pool in the family room in the walkout basement when one of the boys noticed a mushroom growing from under the carpet against the wall. So Dad tore

out the paneling and drywall and found that floor-to-ceiling rot had destroyed the framing and sheathing. His first fear was that he had caused the problem himself; he suspected that he had improperly flashed the ledger board when installing a new deck off the kitchen directly above the rotten wall. But when he pulled off the siding, he found that the framing and sheathing were rotten above the deck as well. The trail led upward, directly to the sill of the kitchen casement window.

His wife was concerned that tearing out all the moldy, rotten wall material had contaminated the house, so I was asked to come out and test the home. She also was curious why the window was leaking, so I asked a builder friend, who told me that the weatherstripping on that brand of window tended to break down with UV exposure.

I invited him out to the home and, sure enough, we found a gap in the seal that ran around the inside of the window frame. The window was on the south elevation,

where it got lots of direct sunlight, and the weatherstripping had simply disintegrated, leaving a 1/2-inch by 1/2-inch hole in the bottom corner of the frame. Because of the way the window frame was assembled, this hole allowed water to run directly into the wall cavity whenever it rained. Studies have shown that such a seemingly small hole can leak gallons of water during a driving storm. Trapped between the sheathing on the outside and the vapor barrier on the inside, the water had nowhere to go. The framing and sheathing stayed soaked, rotted, and eventually produced the fruiting bodies that the kids discovered.

The home was out of warranty, so the builder had no legal obligation to fix the problem. When contacted by the homeowner, the window manufacturer suggested that the homeowner pursue the manufacturer of the weatherstripping. Needless to say, the owner's blood began to boil. Before things got ugly, however, everyone saw the light of reason — with the help of a persuasive attorney. The homeowner repaired the water damage, the window maker replaced the south and west windows, and the builder stepped up and replaced the metal siding that had been torn off. In the end, the home was repaired and its value restored.



### Spots on the Poly

The owners moved into their new home in the spring. By fall, they called the builder to complain about mold in their walkout basement. I was asked to take a look. The walkout walls were unfinished, and the poly vapor barrier and face of the fiberglass insulation were speckled with small dark spots. Microscopic examination of tape lifts from the back of the plastic showed dense growth of *Cladosporium* mold.

Having seen this problem many times, it was easy to identify the cause. Water vapor will condense into a

liquid on a surface that is cooled below the dewpoint. Hot, humid summer air may have a dewpoint above 70°F. On such a day, a can of pop taken from a cooler will almost instantly be covered with water droplets. That's because the surface of the cold can may be more than 30°F below the dewpoint.

Basements are often the coolest part of a home. On a hot, humid day, outdoor air with a dewpoint of 70°F that finds its way through the siding, sheathing, and insulation will reach the back of the vapor barrier. If the temperature of the basement is 68°F — 2°F below the dewpoint — the plastic sheeting will become the first condensing surface. Although the amount of condensation per square inch is much less than would form on a cold pop can, a hot spell of some duration may still provide the necessary moisture conditions for mold to grow. The extent of mold growth is a question of how wet for how long.

There are a variety of fixes for this problem. Although the risk of occupant exposure to the mold in a sealed wall cavity is debatable, once the mold is discovered it becomes a customer-service headache. The owner usually requests that all the moldy areas be stripped of poly and insulation, then cleaned up, and everything properly replaced. Hanging drywall on the studs may warm up the plastic enough to keep it above the dewpoint. Applying inch-thick foil-faced insulating board under the drywall will do a better job of warming up the poly and will provide a more comfortable conditioned space as well. Another option is to replace the conventional poly with a “smart” vapor retarder like the MemBrain from CertainTeed, which will allow warm, humid summer air to pass through without accumulating on the back.



### Those Pesky Party Walls

Townhomes are a popular option for home buyers with tight budgets or limited space needs. In most areas, fire codes require that side-by-side units be separated by party walls detailed to slow flame spread and prevent smoke penetration. The obvious best practice is to install

masonry walls of poured concrete or block. A cheaper and quicker choice is parallel studwalls with facing layers of gypsum-board sheathing — typically paper-faced drywall, which is the cheapest.

Drywall may have a fire rating, but it doesn't perform well when it gets wet.

Imagine trying to preserve a wet newspaper by sticking it in a plastic bag. Similarly, when it comes to drywall, the rate of drying must exceed the rate of wetting. Damp conditions and still air are the best accelerants for mold growth.

I was called out to a job site by a local



## Can Mold Give You Headaches?



code official to inspect a mold problem on a townhome development under construction. The scenario was the same one I had seen on other projects: The gypsum-board party walls of several of the units had a luxuriant growth of black mold.

The source of the problem was obvious. During construction, the gypsum-board party walls were built on footings surrounded by bare dirt. When hot, rainy weather turned the ground to mud, a fungal garden grew, with visible mold extending in a horizontal band from the mudsill up as high as 4 feet. I cut a 6-by-6-inch-square piece out of the moldy drywall on one wall and found that it had mold on both sides. I could also plainly see mold on the back of the adjacent wall's gypsum board.

An argument could be made that the mold on the inside of the party wall presented no risk, as the wall is supposed to be air-sealed to prevent smoke migration. It would be interesting to hear a potential buyer's reaction if disclosure rules required the seller to explain that even though the inside of the wall was covered with mold, it was harmless. I suspect that most customers would opt for a mold-free unit.

But how does one correct such a problem without tearing out one side of the party wall? Surface scrubbing might work, but how does one scrub the inside?

In the end, the builder took the bull by the horns: He supported the upper stories with temporary bracing, tore out the offending paper-covered party wall, and replaced it with concrete block. It was a costly repair, but it worked, and he was left with a property he could sell with pride instead of excuses. He also learned a lesson that will prevent such a problem on future projects.

*Mac Pearce is an environmental health consultant in St. Paul, Minn.*