

# Wood-Inhabiting Fungi

Moisture and wood-inhabiting fungi, a group of lower plant forms, are problems occurring occasionally in Arkansas. They can cause severe problems particularly in high moisture or humidity. Wood-inhabiting fungi feed on living or dead wood because they cannot make their own food. Some parts of fungi are so small they can be seen only with a microscope. Other forms such as mushrooms are quite large. These fungi produce spores (similar to seeds) that are distributed by wind and water. Some spores are present wherever wood is being cut, processed or used.

Upon infection by spores, the fungus develops forming microscopic, thread-like structures known as hyphae (singular-hypha) referred to collectively as mycelium. The hyphae may spread through the wood in all directions from the point of infection, more commonly within but also on the surface of wood.

**All fungi that grow on wood have certain basic requirements:**

- Favorable temperature usually ranging between 50° and 100°F. The optimum is usually 70° to 85°F.
- Adequate moisture-fungi usually cannot degrade wood with moisture content below 20 percent. Decay fungi require wood moisture content of about 30 percent for serious damage.
- Adequate oxygen-fungi cannot live in water-saturated wood.
- Food source.

Fungi are often found in structures in association with termites or in the same area as termites. Damage of fungi and termites commonly occurs together because the same environmental conditions favor both.

Since fungi may cause damage or may indicate the presence of termites, it is important to recognize and distinguish common fungi that attack wood. There are basically three types of fungi that attack wood. These include the surface fungi, the staining fungi and the decay fungi.

Some fungi attack wood only in the log stage and cannot damage or continue developing after installation into a structure or building. No control is

necessary for these; however, it is important to recognize them as types that do not require control measures.

## Surface Fungi

This group includes molds and mildews. They grow primarily in sapwood of coniferous and deciduous tree species. Wood with surface fungi has a powdery appearance or surface discoloration. These fungi do not cause wood decay. They grow only in storage cells of sapwood and do not reduce the strength (other than impact strength) of the wood. Treatment of wood previously attacked by surface fungi and installed in a structure is not required.

Surface fungi are moisture indicators. Their presence suggests that the wood has absorbed an excessive amount of water and is susceptible to other wood-destroying fungi. They do not attack drywood, but they do increase the ability of the wood to absorb more moisture (permeability) leading to further decay problems.

## Staining Fungi

This group of fungi also attacks the surfaces of sapwood of various hardwoods and softwoods, but their hyphae penetrate outer layers of sapwood. These fungi cause a gray to bluish stain that cannot be removed from the wood. They do not cause decay, but they increase the chances that serious decay fungi will enter. They enter wood cells and use the contents as a primary food source. Presence of these fungi also indicates that wood has absorbed an excessive amount of water.

## Decay Fungi

These fungi actually utilize the structural portion of the wood (cell walls) to satisfy nutritive requirements. This results in decomposition which makes the wood less suitable for construction purposes or renders it completely unfit if decay is advanced. They attack the sapwood and heartwood. Chemical substances called enzymes, secreted by the fungi, break down cell wall components (cellulose, hemicellulose and lignin) to products that can be

readily assimilated and utilized. Some types of decay fungi include:

**Cubical brown rot** – This rot causes the wood to break into small cubes with cracks running perpendicular to the grain. This condition is caused by recurring changes in moisture content from wet to dry. The wood becomes brittle and shrinkage occurs as a result of these moisture changes. The wood becomes brown and crumbly and strength decreases rapidly. Cellulose is decomposed and lignin is left which gives a brown appearance. Wood becomes brittle and can be crushed into a powder.

**White rot** – Fungi that cause white rot attack not only cellulose but also lignin. Destruction of the lignin causes a whitish, bleached appearance. The wood becomes lighter colored and stringy when broken. It has a sponge consistency, and the wood loses its strength gradually. White rot is common in crawl spaces that are consistently wet. Shrinkage is generally not associated as a characteristic of this type of rot.

**Soft rot** – Soft rot fungi attack the wood from the surface inward and cause cavities to form. They generally are found in situations where the wood is too wet to be attacked by other decay fungi. This type of rot might be expected in cooling towers, pulpwood chips, marine habitats and in wood contacting the soil. This rot is less destructive than white rot.

**Dry rot** – This is a type of brown rot fungi and is referred to as a water conducting fungus. This fungus has specialized structures called rhizomorphs that conduct water. Rhizomorphs begin to appear as attack by this fungus increases. They are dirty white and become brown or black with age. They may range from 1/4- to 1-inch in diameter. Because of this, the dry rot fungus can attack wood that is resistant to attack by other decay fungi. In some cases this fungus can conduct water up to 25 feet and destroy large areas of wood in 1 to 2 years. Mycelial fans that are papery in texture and whitish-yellow in color may be present.

## Other Plant Growth Affecting Wood

Several other fungi attack wood before it reaches the lumber stage. Pecky rot and pock rot are two of these fungi. They may damage the wood, but they

cannot develop inside a building. Bacteria can grow on wood with high moisture content. They are not destructive but can cause sour odors.

## Control

All fungi that grow on wood have certain basic requirements that include a food source, favorable temperature and adequate oxygen and moisture. A deficiency in any of these requirements will inhibit the growth of a fungus even though it may be well established in the wood. The most practical method of controlling fungi in structures is to control the moisture content of wood.

### Methods of moisture control include:

1. Isolating wood from soil
2. Installing moisture barriers
3. Providing adequate ventilation
4. Improving drainage
5. Applying chemical preservatives

The following check list can be used as a guide in helping avoid problems with decay fungi and/or termites.

### Checklist for decay problems:

1. Flowerbeds next to house. Soil should not touch wood siding.
2. Soil grading. Wood should be at least 3 inches above adjacent finish grade for framing members, 6 inches above finish grade for siding.
3. Lawn sprinkler. Persistent wetting of exterior wood creates high decay hazard.
4. Wood junctions. Decay lurks especially where boards or beams are jointed together, end-to-end. Also, the ends of boards or beams absorb water much more rapidly than do the sides. Metal caps help prevent decay.

5. Ends of exposed beams. Cracks that open as wood dries out permit serious rain wetting. Exposed beams should be treated with preservative. When thoroughly dry, ends should be capped with a metal shield.
6. Roof overhang. A wide over-hang moves water runoff away from exterior walls.
7. Roof dormer and chimney. Flashing must be used between roof and dormer.
8. Roof lines. Water should flow away from house. Otherwise, wooden members are wetted continually. Flashing is needed in these areas.
9. Roof edge. If shingles don't extend enough beyond fascia board, water that curls under the shingle will drain over wood trim at roof edge. Metal edging allows drip line from roof to clear wood trim.
10. Splashing rain. Special hazard: rain from roof falling onto a hard surface like a patio. Install rain gutters with downspouts that direct the drainage away from house.
11. Porch areas. Porch surface must slope away from house to avoid water collection.
12. Wooden posts. Be sure post doesn't touch the porch surface. Direct flowing water away from posts.
13. Plumbing leaks. Stop spillage behind washing machine, leaks at top of built-in tub, or leaks in shower.
14. Condensation underneath house. Some houses need a vapor barrier between the ground and the house.
15. Water collecting under house. Fill holes and make water drain away from house.