

# Wood Decaying Fungi

## **Introduction**

Wood destroying fungus (fungi, plural) causes more damage to structures than all the fires, floods, and termites combined! Wood decaying fungus requires four fundamentals to survive which are oxygen, favorable temperatures, water, and food. Fungus occurs generally when the moisture content of wood exceeds 20 to 30 percent, coupled with optimal temperatures (32° – 90° F), an adequate supply of oxygen and a suitable source of energy and nutrients.

Fungus is a plant that lack chlorophyll. Unable to manufacture its own food, it feeds off of cells in the wood. The fungus secretes enzymes that break down the wood into usable food. Fungi will significantly reduce the strength of the wood, if the condition continues over a period of time.

## **Identification**

### White Rot Fungi

White rot breaks down all major wood components (cellulose, hemicelluloses and lignin) more or less simultaneously, and commonly causes rotted wood to feel moist, soft and spongy, or stringy and to appear white bleached. Wood affected by white rot normally does not crack across the grain and will only shrink and collapse when severely degraded. The strength of the infested wood decreases gradually until it becomes spongy to the touch and stringy when broken.

### Brown Rot Fungi

Brown rot primarily decays the cellulose and hemicelluloses in wood, leaving a brown residue of lignin, the substance which holds the cells together. Wood affected by brown rot is usually dry and fragile, readily crumbles into cubes because of longitudinal and transverse cracks (tending to crack across the grain). Infected wood may be greatly weakened, even before any external evidence of decay can be seen. Brown rot is generally more serious than white rot.

Old infestations of brown rot which have dried out will turn to powder when crushed. They are often labeled as "dry rot." This common term is deceiving, because dry wood will not rot! Actually, wood kept dry will never decay.



### Water-Conducting Fungi (poria incrassata)

*Poria incrassata* is a brown rot fungus. Whereas most wood decaying fungi must rely on a water leak, or ground contact condition, to obtain the required water, *poria incrassata* has developed specialized root-like water-conducting tubes, called rhizomorphs, which allow it to transport water from the soil to the wood. Therefore, even in situations where wood is protected from rainfall, and no leaks exist, wood can still be decayed by *poria*. Once established, it can quickly spread through a building and destroy large areas of flooring and walls in as little as a year or two. Fortunately *poria incrassata* is not very common in the San Francisco Bay Area.

### Soft Rot Fungi

Soft rot fungi degrade only the cellulose and hemicelluloses, and typically occur in wood of high water content and high nitrogen content. Soft rot fungi look like brown rot. They are most commonly found in rotting window frames, wet floor boards and fence posts, etc., where nitrogen is recruited from soil or from atmospheric contamination. Some of these fungi are common decomposers of cellulose in soil and they are the least specialized of the wood decaying fungi.

### Molds (Non Wood Decaying Fungi)

Molds are microscopic fungi that live on plant or animal matter. The presence of surface molds can be confused with wood decaying fungi. Although mold organisms may discolor the wood, they do not break down wood fibers and thus do not weaken its structure. However, these organisms could indicate a moisture level in the wood high enough to also support the growth of wood decay fungi. Molds also can increase the capacity of wood to absorb moisture, opening the door for an attack by wood decay fungi. Moisture control methods used to inhibit wood decay fungi will also eliminate conditions favorable for mold to grow.

## Preventive Measurements

Water is the enemy of wood! Moisture control must be an integral part of any plan designed for the prevention of wood decay fungi. The following guidelines are a good way to start:

- Untreated wood should never be in contact with the ground. Posts, piers and framing members should always be placed on concrete footers above the surrounding soil level.
- Ventilation in crawlspaces is critical to prevent “dead air” spaces. Adequate cross ventilation beneath the structure will minimize “dead air” spaces. Vents should be installed at a minimum of two square feet per openings for every 25 linear feet of wall. Avoid any obstructions of the vents by vegetation, storage or physically sealing off openings.
- In crawlspaces with continuously moist soil a vapor barrier can be installed to minimize condensation onto framing components. Vapor barriers are designed to maintain the moisture at the soil level.
- Use pressure treated wood, properly, or select heartwood (redwood, cedar) if moisture conditions are unavoidable (decks, wood in ground contact, etc.).
- Wood may be protected from decay with a borate treatment by a licensed professional.
- Repair plumbing leaks as soon as they are noticed.
- Rain gutters and downspouts should be cleared of debris. Roof leaks should be fixed immediately.
- Maintain all exterior wood surfaces sealed with a water repellent paint or stain.
- Maintain all interior wood window sills sealed with a water repellent paint or stain, since condensation is common around windows
- Keep all commodes secured tightly to the floor to minimize possible leakage at the seal.
- Periodic inspection should be part of a routine maintenance schedule.



## Treatments

Proper identification of fungus through a wood destroying pests and organisms inspection is essential to developing the appropriate control measures.

- Borates provide an effective method of treating for the protection of wood and wood-foam composite structural components against wood decay fungi.
- Borates are highly destructive to all wood destroying organisms and, unlike other wood preservatives, they are non-volatile, odorless, and are less toxic than table salt. They do not discolor the wood, are non-corrosive, environmentally safe and known to be effective in controlling more than 45 different species of wood decaying fungi.
- Within a few days after a treatment has been completed the fungi will begin to die and dry up. Occasionally the dead fungi will emit an unpleasant odor as it decomposes. This odor will only last a couple of days and may be minimized with the circulation of fresh air into the treated area.
- Although borates will kill wood decay fungi, it will not add strength to the damaged wood.
- If the fungi have actually damaged the wood, the corrective action will depend on extend of the damage. The most effective and common method for moderate to severe damage is to replace the damaged wood. However, if only a small area is affected, borates and reinforcing the damaged wood are a cost-effective alternative.