Ohio State University Extension Fact Sheet

Entomology

1991 Kenny Road, Columbus, Ohio 43210-1000

Wood Rot

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Spores Spread Decay Fungus

Many homeowners are familiar with wood damage caused by rot. They see it in structural lumber, log homes, eaves, garage doors, exterior door trim, window casings and other wood used in construction. Current estimates show that replacement materials, needed to repair damage caused by rot alone, account for nearly 10 percent of U.S. annual wood production.

Blame for this destruction is sometimes incorrectly placed on termites or other wood-destroying insects. However, there are no mud tunnels or mines in the wood such as seen with termite and other wood-destroying insects, nor is there any sawdust, which would be evident in the case of carpenter ant damage.

The key to preventing rot is to control the wood's exposure to moisture and to employ an effective prevention and treatment program. Most wood decay fungi grow only on wood with a high moisture content, usually 20 percent or above. Green (unseasoned) lumber is a prime target for decay fungi.

Identification

There are two main classes of wood rot. In one type, the decayed area has a brown discoloration and a crumbly appearance. It usually breaks up into variously-sized cubes, giving rise to the name "brown cubical rot." Another type of rot results in a white or yellow discoloration, with the decayed wood being "stringy" or "spongy."

Although many decay fungi may grow for long periods without producing any external evidence of their presence, others produce

"fruiting bodies" on the surface of decaying wood. Fruiting bodies are usually "crusts" or shelflike "brackets" which are a few inches or so in diameter. The fruiting body of *Serpula lacrimans*, e.g., is a rust-brown, crust-like structure on the wood surface. It has a waxy appearance, with shallow, net-like folds or "wrinkles." The fruiting body of *Poria incrassata* is also crust-like. It is white to light buff when initially formed, but becomes brown as it ages and dries out. Small pores can be seen in the crust when it is examined with a hand lens. *Gleophyllum trabeum* forms bracket-like fruiting bodies. The upper surface of the fruiting body is dull gray-brown and smooth. The lower surface has elongate openings (pores) or split-like openings (gills). These fruiting bodies produce millions of tiny spores which may, in some cases, serve to spread the decay fungus to other areas.

Also, surface molds, "mildews," and stain fungi are often found growing on the surface of damp wood and can be confused with decay fungi. Although these organisms may discolor the wood, they do not break down wood fibers and thus do not weaken its structure. However, these organisms indicate that moisture is present and that decay will likely proceed if a wood-rotting fungus becomes established in the wood.

Life Cycle & Habits

Decay fungi are living organisms which send minute threads called "hyphae" through damp wood, taking their food from the wood as they grow. Gradually, the wood is decomposed and its strength is lost. Such damage is often inconspicuous until its final stages, and in a few instances homeowners have suddenly found floors breaking through or doors falling from their hinges due to wood rot. When previously dry wood is placed in contact with moist soil, or in a location where it is subject to condensation (such as unventilated crawl space), it is likely that wood decay problems will occur. Rain leaks, faulty plumbing and leaky downspouts also are common sources of moisture. In some instances, water can be transported to the site of decay through strands or "rhizomorphs" of the decay fungi. Water-transporting strands may extend for thirty or more feet across brick, concrete or similar materials. The wood decay fungus, *Serpula lacrimans*, has been known to transport water up three stories to an area where decay is occurring. *Poria incrassata* is also capable of transporting water long distances. However, these fungi are exceptions to the rule. Most wood-rotting fungi must have a direct supply of water at the site of decay. Thus the term "dry-rot," sometimes applied to decay in wood structures, is erroneous.

Control Measures

Prevention

1. If the decay hazard is high, select the heartwood of decay-resistant species or use wood properly treated with a good preservative. Conifers from which decay-resistant lumber is produced include Pacific yew, juniper, redwood, baldcypress, and western red cedar. Durable hardwood species include osage orange, black locust, red mulberry, catalpa and black walnut.

2. Build on a well-drained site. Use proper grading to prevent water from seeping under the house. Install effective drain tile, roof overhang, gutters, and downspouts. Place no untreated wood within 18 inches of the ground.

3. Provide adequate cross ventilation beneath buildings to eliminate dead air pockets. Install two square feet of opening for 25 linear feet of wall. Dense bushes or other plants should not be placed in front of these ventilators.

4. Install a vapor barrier on the soil surface to cause soil moisture to condense on the barrier and return to the soil rather than condensing on the floor and above joists. Satisfactory barriers can be made by covering the soil with asphalt roofing paper or polyethylene sheets.

Repair of Decayed Buildings

First determine the source of moisture and remove it. If adequate ventilation and soil drainage are provided and all contacts of untreated wood with the soil or moist concrete or masonry are broken, decayed wood will dry out and further decay will be stopped. When making replacements, cut out at least one foot beyond the rotten area. Avoid placing new lumber in contact with old, decayed wood. Replacement lumber should be treated before installation. Remodel to provide more ventilation and better design rather than simply replacing decayed lumber.

Chemical Treatment

Disodium octaborate tetrahydrate or sodium borate with brand names of Bora-Care®, Guardian®, Jecta®, Shell-Guard®, Tim-bor® and Impel® rods are labelled for protection and treatment of wood and wood-foam composite structural components against decay fungi and wood destroying insects. For example, remedial control of organisms attacking wood, apply a 15 percent or two applications of 10 percent aqueous solution of Tim-bor® 98 percent (1-lb/gallon solution) or Bora-Care® diluted 1:1 or 2:1 with water. The solution may be applied by brush or spray until the surface is thoroughly wetted (approximately five gallons per 1,000 square foot). An application may also be made by drilling, and then injecting the solution directly into the infested area. Inject a sufficient amount of solution to cause runoff from exit holes drilled into the infested wood.

Also one may apply Tim-bor® dust to infested wood by drill and injection directly into galleries (a passage or tunnel made in wood by an insect); or dust wood surfaces and wall voids at a rate of two to three pounds per 100 square foot. Tim-bor® is applied by licensed pesticide applicators or pest control operators. For product information, contact U.S. Borax Corporation, 1(800)9-TIM-BOR.

Shell-Guard® and Guardian® are labeled for protection and treatment against decay fungi and wood destroying insects. These two products are formulated with propylene and polyethylene glycols, making them doubly safe to use. Since these products are borate based, the protection is permanent after application. Guardian® is the highest concentration available in a formulated borate product. It can be directly injected into holes to provide fast penetration into problem areas. Rapid diffusion is assured by the formulated carriers. Holes can be sealed to match the original finish of the wood.

Shellguard® is a liquid, labeled for topical application. Because of its concentration, multiple applications are unnecessary. Like Guardian®, one application is all that is required. Both of these products are labeled for home use, and can be easily and safely applied by the homeowner. (For further information on either Shellguard® or Guardian®, contact Perma-Chink Systems at 1-(800)-548-1231 or 1-(800)-548-3554.

Another formulation known as Impel rods is molded from highly concentrated water-diffusible boron into a solid tube resembling glass in appearance. These rods are internationally recognized as an effective preservative and deterrent to rot. Unlike fumigants and sprayed or brushed on preservatives, Impel Rods are inserted through small holes strategically drilled into wood where signs of rot are evident or in high-risk, rot-prone areas. The holes are sealed and may be finished to match the wood's original appearance. Rods are odorless, EPA registered, do not stain wood and are available in various sizes to fit virtually any application from heavy timbers and posts to millwork and door frames.

However, where damage threatens the structure integrity of wood, the wood should be replaced.

Whenever the moisture content of wood is high enough to sustain rot, Impel Rods® slowly dissolve, spreading the active borate protection into the area surrounding the rod. When the wood dries, the preservative remains in the wood. As the cycle is repeated, the preservative builds up as an effective deterrent to rot. (For further information, contact Nisus Corporation, 215 Dunavant Drive, Rockford, TN 37853 Telephone: 1-(800)-264-0870, Fax: (423)-577-5825).

In the past, pentachlorophenol (Penta®) and copper naphthenate was used as a stop gap measure. (These chemicals had offensive smells and were not environmentally safe.) Now with a growing environmental concern, various formulations of sodium borate do not pose a serious threat. A key valve is the absence of offensive smells sometimes associated with other common treatment methods. Also, existing moisture in the wood enhances chemical penetration.

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