

WOOD BORING BEETLES & DECAY FUNGI

PEST CONTROL TECHNICAL BULLETIN

Wood Boring Beetles

Wood boring beetles are a major cause of structural damage in homes and other structures. Some beetles attack softwoods, others attack hardwoods and some attack both. Although often referred to as "powder post beetles," three separate families of beetles - anobiids, lyctids, and old house borers - are responsible for most of the beetle damage to structural wood.

Wood boring beetles have life cycles that include egg, larvae, pupae and adult stages. BORA-CARE® kills the eggs and eliminates young larvae, thus preventing re-infestation by interrupting their life cycle.

BORA-CARE application methods for treating all beetle infestations are similar, however you should become familiar with the different infestation characteristics in order to know what to look for during inspections and what to expect after treatment.

Powder Post (Lyctid) Beetles

Powder post beetles infest only hardwoods and are often found in manufactured products in relatively new homes. They can be introduced as eggs or larvae in firewood, improperly dried wood, or wood that has been stored. Hardwood flooring, furniture, door and window frames and decorative trim are particularly susceptible to attack. Their short life cycle, large initial populations, and high survival rate often result in rapid and expensive damage. The larvae are responsible for all damage and feed entirely within the wood. Most infestations are not discovered until adult beetles emerge through the wood surface. Emergence holes are round, 1/32" to 1/8" in diameter and the frass is loosely packed with the feel of fine talcum powder - thus, their common name of powder post beetle.

Lyctid powder-post beetles will attack wood with moisture levels of eight to thirty-two percent but prefer a range of ten to twenty percent, typical of that found in most homes. The greatest period of activity occurs in late winter or early spring. The adults conceal themselves in cracks and holes in the wood during the day and become active at night.

Anobiid Beetles

Anobiid beetles are one of the few beetle species that will attack both hardwoods and softwoods. Anobiid exit holes are round and about 1/8" in diameter. Larvae feeding in softwoods produce numerous oval pellets which have a gritty feel. Infestations usually begin in crawl spaces or other areas where wood is near the ground. High moisture levels in the wood will speed the development of these beetles and, under favorable conditions, the cycle of re-infestation can occur within one to two years. Damage is usually detected in homes older than ten years since infestations develop slowly. Adult beetles are active only at night and may become numerous in early to late spring.

If an active infestation is found in a 15 to 20 year old building, all wood should be carefully inspected for signs of infestation. This is especially important for structures on poorly drained sites or in warm, humid climates. Exit holes indicate that adult beetles have emerged and will continue to re-infest unless controlled.

Old House Borers

In some areas of the country, the old house borer is second only to termites in damage to structural wood. Found from Maine to Florida and west to Michigan and Texas, the behavior of old house borers is far different than their name suggests. Old house borers prefer to attack recently seasoned wood and are typically found in

newer homes. Infestations are often introduced in firewood or through the use of lumber that contains eggs or small larvae. Usually, noticeable infestations are limited to a few wood members, however, adjoining sound boards may also be infested by young larvae. Depending on conditions, damage may not be detected until adults emerge three to ten years after the initial infestation.

As opposed to most other beetle species, old house borers prefer dry wood containing ten to twelve percent moisture content. Both the adult exit holes and the feeding tunnels of large larvae are oval and about 1/4" in diameter. Galleries near the surface cause lighter colored streaks to appear on the wood surface. The frass is a coarse, tightly packed powder. One typical characteristic of an old house borer infestation is the noise older larvae make while feeding. Often this chewing noise is what will first alert the homeowner that an infestation is present.

Decay Fungi

Wood decay fungi can cause severe structural damage to any wood member, even wood species such as redwood and cedar. All that is needed is a source of water in contact with the wood. Decay will occur in untreated wood in direct contact with ground, cement or concrete, or exposed to a source of moisture such as rain seepage, plumbing leaks, or condensation. Structural wood with a moisture content of 10 to 20 percent will not rot. Surface molds and mildew will form on wood with a moisture content of approximately 20 to 25 percent. Decay fungus requires a wood moisture content of approximately 25 percent or higher to survive.

Once decay has started in a piece of wood, the rate and extent of deterioration will depend on conditions such as temperature and moisture content. Under suitable conditions, most fungi species develop fruiting bodies of various shapes, colors and sizes. These fruiting bodies contain enormous numbers of microscopic spores which act like seeds. If a spore comes in contact with a suitable material such as moist wood, it can germinate and spread the infestation. Many people exhibit allergic reactions to fungal spores - another reason that mold and decay should be controlled around homes and offices.

A good inspection is important as evidence of some wood decay fungi may not be readily apparent prior to wood damage.

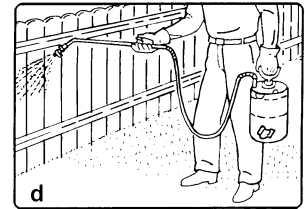
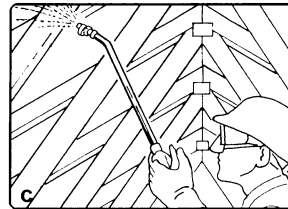
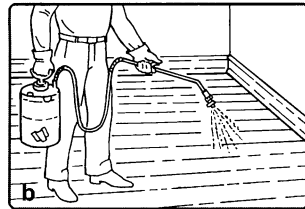
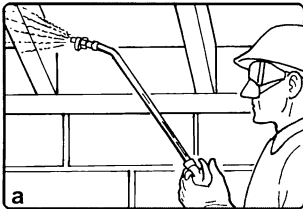
Brown Rot

Brown rot fungi feed on the wood's cellulose, a component of the wood's cell wall, leaving a brown residue of lignin, the substance which holds the cells together. This rot is more common in soft woods and infested wood may be greatly weakened, even before decay can be seen. Advanced infestations of brown rot are evidenced by wood more brown in color than normal, tending to crack across the grain. When dried, wood previously infested will turn to powder when crushed. Often, old infestations of brown rot which have dried out are labeled as "dry rot." This is really a deceiving term since wood will not decay when dry.

White Rot

When white rot attacks wood, it breaks down both the lignin and cellulose causing the wood to lose its color and appear whiter than normal. White rot is more common in hardwoods and when wood is affected it normally does not crack across the grain and will only shrink and collapse when severely degraded. Infested wood will gradually lose its strength and become spongy to the touch.





BORA-CARE can be applied: a) in basements and crawlspaces; b) on unfinished wood floors; c) in attics; and d) on outdoor wooden structures.

Water-Conducting Fungi

Most decay fungi are unable to conduct water very far and can only attack moist wood. However, *Poria incrassata*, called dry rot or the water-conducting fungus, will decay wood which would not be attacked by typical decay fungi. Poria infested wood is often mistakenly identified as subterranean termite damage. This type of fungus can transport water for several feet through large root-like structures called rhizomorphs. 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.

Typically, infestations of *Poria* begin in earth-filled porches, damp crawl spaces, and basements where wood is in contact with the soil, moist concrete, or damp bricks. At first, yellowish mycelial fans grow over the surface of joists and sub-floors, or in protected areas. Irregular root-like rhizomorphs may appear on foundations, framing, sub-flooring, and other moist areas and are typically 1/4" to 1/2" wide. They are often hidden in concrete, masonry, or behind wood structures. Fruiting bodies may form on well rotted wood.

When *Poria* infested wood dries it usually shrinks and cracks across the grain. Such cracks or depressed areas in painted woodwork may be the first evidence of a *poria* infestation. The best tool for discovering a *Poria* infestation is a moisture meter. If wood has a high moisture content and there is no apparent source of water, you are probably confronting *Poria incrassata*.

Mold and Stains

Molds and stain fungi are sometimes mistaken for decay, and while they may discolor wood, they cause no structural wood damage. The presence of molds and stains, however, is a sign that conditions are favorable for decay fungi and a preventative treatment may be necessary. In addition, molds can increase the capacity of wood to absorb moisture, opening the door to attack by decay fungi.

Treatment of Wood Infested by Beetles and/or Decay

BORA-CARE® application methods for treating beetle and decay infestations are similar. Treat the infested and surrounding area with BORA-CARE according to label directions. When practical, inject diluted BORA-CARE solution into beetle emergence holes and galleries. It is important to treat the entire infested wooden member.

Since wood can contain active beetle larvae or fungal spores with no surface evidence of infestation, the best method of control is to treat the entire area where an infestation has been found. This would include all of the wood in a crawl space, wall, or attic showing any signs of damage.

Infested wood flooring can be treated with BORA-CARE by spray

or brush application. Any existing finish must be removed by sanding or stripping prior to application. Refer to the BORA-CARE label section on treating flooring for application rates and methods.

When possible, direct spray application is recommended, however, inaccessible areas, such as wall voids, can be treated by foam application.

When controlling decay fungi, treatment with BORA-CARE should not be considered as a replacement for moisture control. Leaky plumbing and drain spouts should always be repaired in addition to treatment. Wet crawl spaces should be vented and plastic sheeting installed. Structural wood members that are no longer sound must be replaced.

Preventative Treatments

Uninfested wood may be protected from insects and decay with a BORA-CARE treatment (see BORA-CARE label for appropriate dilution ratios and application methods). After treatment, exterior treated wood surfaces should be coated with a water repellent finish such as paint or stain. It is important to allow the BORA-CARE to completely dry before applying any protective topcoat.

Treating Wood in Contact with the Ground for Decay

BORA-CARE may be applied to wood in contact with the ground or soil. However, water passing through the wood will limit the life of a BORA-CARE treatment. A better approach is to inject JECTA® DIFFUSIBLE BORACIDE into the high risk area. JECTA will last longer than BORA-CARE in this situation. In addition to eliminating and protecting the wood from decay, JECTA is also effective against subterranean termites. Refer to the JECTA DIFFUSIBLE BORACIDE specimen label for complete application instructions.

Efficacy of Treatment




The time required to completely eliminate a beetle infestation with BORA-CARE is influenced by several factors. These include the time of year treatment is performed, beetle species, the degree and age of the infestation, the wood species, moisture content, wood thickness, and application technique. BORA-CARE is extremely toxic to beetle eggs and young larvae. However, older larvae of species such as old house borers are more resistant and must ingest a large quantity of the treated wood in order to be killed. Since some of these older larvae can take several years to mature and eat very little wood, they may be able to pupate and emerge several months after treatment. This normally occurs only in logs or large beams. Any beetles which do emerge cannot re-infest treated wood and their life cycle is broken at that point. Should isolated beetle activity continue after treatment, individual larvae may be located and eliminated using localized injection techniques.

The season when treatment is performed may also influence the time required for total eradication. Applications during late fall and winter - the beetles dormant phase - have limited immediate effect on mortality. When the larvae become active again in the spring, they will ingest the treated wood, causing death. In general, complete elimination of large beetles such as old house borers may require several months to a year. However, the large majority of active beetle larvae and eggs will be killed more quickly. Elimination of surface molds and decay fungi progresses rapidly after treatment with BORA-CARE. Within one week, molds will begin to disappear and fungi fruiting bodies will begin to dry out.

BORA-CARE has no odor, however, the decomposition of dead fungi may occasionally result in a "rotten" smell a few days after treatment. This odor will only last a few days and can be eliminated with the use of biological odor control agents, such as BAC-AZAP®.

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BEETLE TYPE	EXITHOLE SIZE & SHAPE	CHARACTERISTICS OF FRASS & TUNNELS
Powder-Post Beetles (Lyctids)	 Round 1/32" - 1/8"	Round tunnels, loosely packed with very fine powder.
Anobiid Beetles	 Round 1/16" - 1/8"	Round tunnels, loosely packed with powder and oval, gritty pellets.
Old House Borers	 Oval 1/4" - 3/8"	Oval tunnels, tightly packed with coarse powder and small pellets.

