



**Powderpost Beetles in Hardwood Floors:** Homeowners with new hardwood floors are occasionally dismayed to discover birdshot-sized holes surrounded by fine powdery dust appearing in their floors. This problem usually occurs in solid hardwood flooring or flooring with thick hardwood lamination during the first one to three years after the floor was installed—while the memory of the cost of the flooring is still fresh. Detection of this situation usually triggers a series of questions: What is causing this? How and when did these insects get started in my floor? Will the problem continue to grow? Can they spread to other wood in the house? What can I do about this problem? Let's consider these questions one at a time.

*What is causing this?:* The insects responsible are powderpost beetles (family bostrichidae, subfamily lyctinae), sometimes referred to as “true” powderpost beetles to distinguish them from other groups of wood-boring beetles. There are several species, with the southern lyctid and brown lyctid being two of the more common. Adult beetles are brown with flattened, elongate bodies about 3/16 inches long. Superficially, these beetles look a lot like some of the beetles that occur in cereal products and other dry stored foods. True powderpost beetles infest the sapwood of hardwoods, but do not attack the darker heartwood. They prefer hardwoods with large pores, like pecan, hickory, ash, mahogany, and certain oaks, because they lay their eggs in these pores. True powderpost beetles do not infest softwoods like pine and spruce. Once the eggs hatch, the larvae tunnel within the wood for around 7 to 12 months, pupate, develop into adults and cut emergence holes (about 1/16 inch) through the surface of the wood, leaving accumulations of very fine, baby powder-like frass. Development can take several years under suboptimal conditions. Emergence of adult beetles is most common during spring through summer.

*How and when did these beetles get started in my floor?:* This is a difficult question to answer definitively because female beetles will lay their eggs in suitable hardwood anytime they have access to unfinished surfaces. Infestations can begin at the saw mill, when female beetles lay eggs in recently processed lumber. However, lumber used in wood flooring is usually kiln dried before processing into the final product and the temperatures involved in the drying process will kill any insects or eggs present in the wood. This means infestations in hardwood flooring must begin at some point after the lumber is removed from the kiln. This could occur before the lumber is processed into flooring; after processing and while the flooring is still on site, in shipment, or in storage at the distributor's warehouse; or after purchase while the flooring is stacked at the installation site. In short, the initial infestation began after the lumber was kiln dried and before the flooring was installed and finished, but this could have been when the flooring was in possession of the original producer, the distributor, or the homeowner. Processed wood flooring is often packaged and shipped in cardboard containers to protect it from scratches and damage, and this also helps protect it from egg-laying beetles.

*Will the problem continue to grow?:* Yes and no are both valid answers to this question. When emergence holes are first noticed in a wood floor it is likely there are other beetles still developing in the wood that have not yet emerged. Emergence can continue over a period of many months to several years, and the problem, in terms of the number of emergence holes in the floor, will continue to grow during this time. Depending on how heavily the wood is infested, a floor may end up with only a few dozen inconspicuous emergence holes, which is the most common scenario, or, in rarer situations, some boards may have hundreds or even thousands of emergence holes. Some boards will be infested more than others because infestations are limited to the lighter sapwood and seldom occur in heartwood. Also, when

flooring is stacked in bundles, boards on the outsides of the bundles are exposed to egg-laying beetles, while interior boards are protected, and this is another reason infested boards are often spottily distributed in finished floors.

True powderpost beetles (lyctinae) will re-infest exposed, unfinished wood for several years, but active infestations will decline over time even in unfinished wood because wood becomes less suitable for larval survival as it dries and ages. The larvae cannot develop in wood that has a moisture content of less than 8% and wood more than a couple of decades old is much less likely to be attacked than wood less than five or six years old.

In most situations involving hardwood flooring, emerging adult beetles will not be able to lay eggs to re-infest the floor with another generation because the females need to have access to unfinished wood to lay their eggs. When the surface of the floor is finished with some type of sealant and the underside of the floor is resting against some type of subfloor the female beetles do not have access to open wood pores. One important exception here is that female beetles can and will lay eggs in old emergence holes, as well as in cracks in finished wood. This can be prevented by frequently waxing floors or taking other steps to promptly and completely seal emergence holes during periods when beetles are actively emerging.

*Can they spread to other wood in the house?:* The short answer to this question is yes, but only if there is other suitable wood in the house. True powder post beetles will not infest softwoods, so there is no concern about them spreading to pine, spruce, fir, or other softwood lumber. Also, they are not able to infest finished hardwood in furniture, cabinets, support beams, or other finished hardwood surfaces. However, hardwood with unfinished surfaces, as might be found in inner surfaces and undersides of new hardwood furniture, cabinets and shelves, or in unfinished hardwood beams or mantles would be subject to attack. Hardwood that is very old, such as antique hardwood furniture, is not likely to be attacked by true powderpost beetles even on unfinished surfaces, but it is likely you will find signs of past infestations if you carefully examine such furniture.

*What can I do about this problem?:* The first step is to prepare yourself ahead of time by recognizing and accepting that there is always some risk of powderpost beetle infestations in new hardwood floors. Storing flooring inside and keeping it in the origin packaging (if shipped in packaging) until installation time, and finishing and sealing the floor as soon as possible after completion will help reduce the potential for last minute infestations.

Monitor floors closely during the first few years after installation. If you detect emergence holes seal them promptly by waxing or by other means to prevent re-infestation. It may also be appropriate to contact the company that produced or installed the flooring to alert them you are having a problem, but don't be too hasty to start replacing flooring. Having flooring replaced is messy and disruptive. Start replacing boards too early and you may end up having to go through the process again as more damage appears. Also, when infestations are light, as is often the case, many homeowners find they prefer to simply live with the damage, which often ends up being fairly inconspicuous, rather than go through the disruption of replacing boards and refinishing the floor.

Occasionally, some floors are so heavily infested that boards have to be replaced. Heavy damage is usually limited to boards with large areas of sapwood and heavily infested boards may be scattered throughout the floor, rather than concentrated in one area of the floor. In cases where heavy damage is concentrated in one area of the floor, use a moisture meter to check the moisture content of the areas where damage is greatest and compare to that of uninfested areas. Elevated wood moisture content can improve beetle survival and exacerbate infestations.

*Examples of true powderpost beetle infestations:* Following is a brief summary of some of the cases of powderpost beetles in hardwood flooring we have observed over the past few years:

- Light infestations (most common situation, about ten cases): Homeowner observed a few dozen emergence holes, but opted to take no action other than sealing emergence holes. Activity diminished over two to three years.
- Moderate infestations (two cases): Heavy damage to a dozen or fewer sapwood/part sapwood boards scattered throughout the floor. Heavily damaged boards were replaced and floor was refinished.
- Severe infestation (one case): Floor experienced flooding due to plumbing leak approximately 3 months after installation, resulting in water seeping between flooring and concrete subfloor, elevating moisture levels. Large section of floor replaced due to water damage and floor refinished. Beetle emergence observed in spring of the following year, with continued emergence in each of the following three years (no attempts to seal emergence holes). Beetle emergence was limited to downstairs sapwood boards that were not replaced after the water damage (by year four some boards were so severely damaged they would not support the weight of an occupied chair leg). Only two beetle emergence holes were found in upstairs floor, which was same age and type as downstairs. Heavily damaged flooring had to be replaced/refinished again (year 4 after plumbing problem). Some beetle emergence holes observed in unfinished interior surfaces of new hardwood furniture.

*Powderpost beetles in other situations:* True powderpost beetle (lyctinae) infestations can also occur in items other than wood flooring. Practically any item made of hardwood is subject to attack: furniture, cabinets, beams, fireplace mantles, molding, picture frames, window casings, door facings, wooden bowls, statues, and other carvings. Imported bowls, carvings, and other items made from imported hardwoods are often infested with these or other wood-boring insects due to inadequate drying practices. True powderpost beetles can also occur in crawlspaces of buildings with hardwood joists and support timbers, where they may be followed by infestations of anobiidae beetles (family anobiidae).

*Other wood-boring beetles:* Although this article focuses specifically on true powderpost beetles in recently installed hardwood flooring, it is important to be aware that many other groups of wood-boring beetles occur in buildings. One important group belongs to the family anobiidae, which are sometimes referred to as deathwatch beetles. Unfortunately, deathwatch beetles, along with members of another group, are also sometimes referred to as “powderpost beetles, or “false” powderpost beetles. The damage anobiidae beetles cause is similar to that of “true” powderpost beetles, but there are important differences. Anobiidae beetles will attack softwoods and hardwoods, and some of the more important species prefer to attack older wood (wood that is decades old). Also, these beetles prefer wood with higher moisture content and can be especially damaging when they occur in crawl spaces or other places where they attack support timbers and other structural timbers of older buildings.

*Control Options for Wood-Boring Beetles:* Control varies depending on the situation, species of beetle involved, and type of wood being attacked. Following is a brief summary of some of the available methods of prevention and control for wood-boring beetles.

- Kiln dry lumber. Proper kiln drying kills all insects in newly sawn or salvaged lumber. Hardwood lumber that is not kiln dried is likely to be infested by true powder post beetles.

- Finish exposed wood surfaces promptly to prevent egg-laying.
- Protect against plumbing and structural leaks and other moisture problems. Dry wood is less susceptible to wood-boring beetles, termites, and wood decay fungi.
- Promptly seal emergence holes in finished wood surfaces to prevent female beetles from laying eggs in emergence holes and perpetuating infestations.
- Do nothing—allow infestation to run its course. This can be a practical and effective way of dealing with light infestations of true powder post beetles in finished wood because wood becomes less susceptible as it dries and ages.
- Remove and replace heavily infested/damaged boards in recently installed wood floors.
- Place infested items in freezer at 0° F, for one to several weeks, depending on thickness of the wood. Useful for treating small items such as carvings and picture frames (Some risk of warping or checking).
- Treat unfinished wood with BoraCare (Disodium Octaborate Tetrahydrate) or other labeled borate products. Useful treatment for unfinished wood surfaces on wood not in direct contact with soil to provide remedial or preventive control of wood-boring insects. Borate treatments may be applied professionally to protect exposed wood in crawlspaces, log cabins, etc (properly applied borate treatments also provide protection from termite attack and wood decay fungi). See product label.
- Chamber fumigation. Infested furniture and other small wood items can be treated by placing in a sealed chamber and fumigating with sulfuryl fluoride (Vikane). Sulfuryl fluoride is a deadly, but short-lived gas that may only be applied by trained and licensed professional applicators. Proper fumigation will kill all insects and eggs present in the fumigated item. Only a few professional pest control companies provide this service.
- Whole Building Fumigation. Heavily infested buildings can be “tented” with gas-proof covering and fumigated with sulfuryl fluoride (Vikane) to control heavy infestations of wood-boring insects. This is an expensive (usually several thousands of dollars), but effective treatment that can only be applied by properly licensed professionals. Proper fumigation will kill all insects present, but fumigation provides no residual control. Only a few professional pest control companies offer this service.

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