Powderpost Beetles: Worms In Your Woodwork

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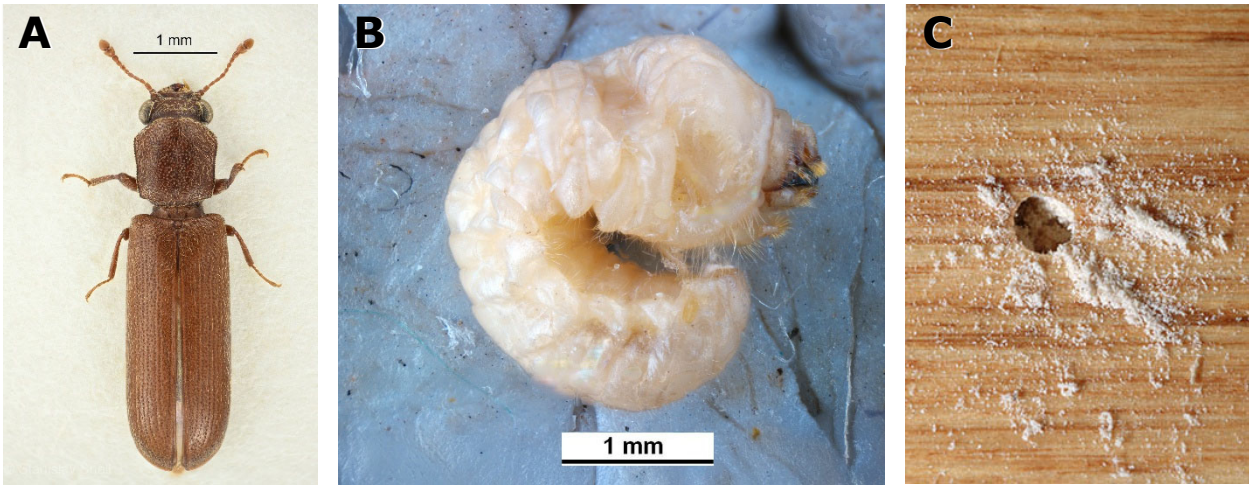
The name **powderpost beetle** may refer to a number of small wood-boring beetles that reduce seasoned wood to a fine powder. The larvae ("woodworms") damage wood as they feed, burrowing narrow tunnels beneath the surface. They are typically only discovered when adult beetles exit, creating a small hole (1/8 - 3/8") and releasing the powdery sawdust. While rarely weakening the structure of timbers, they can damage the appearance of furniture and other wooden items.

Newly emerged adults deposit eggs on or just below the surface of bare, unfinished wood. When these eggs hatch, the larvae tunnel into the wood, feeding and growing, and excavating their own passages. They may not emerge for several years, depending on a combination of factors that include species of beetle, nutritional content of the wood, temperature, and humidity.

These insects are usually introduced into a home in wood that was not properly kiln-dried. They may occur in wood flooring, trim or structural timbers used in building or remodeling. Other items that can be infested by powderpost beetles include wooden furniture, tools or tool handles, picture frames, gun stocks, books, toys or musical instruments. Most species are small and cryptic, so homeowners may only notice the damage, and never see the insects themselves. Beetles may be observed near damaged wood or on windowsills where adults were attracted to the light. They may also be brought indoors within infested firewood.

The complex of species known as powderpost beetles actually belong to several closely-related groups. True powderpost beetles are in the subfamily **Lyctinae**, formerly considered an independent family (Lyctidae), but now classified within the family **Bostrichidae** (false powderpost beetles or auger beetles). **Anobiinae** (deathwatch or furniture beetles) was also formerly its own family, but is now a subfamily within Ptinidae, and is often included with powderpost beetles for the similar damage they cause. Each of these groups has slightly different habits, nutritional needs and control recommendations. Together, these beetles are second only to termites in their ability to damage dry, seasoned wood, structural supports, and manufactured wood products. Mistakes are sometimes made in determining what pests may be active, and if control is warranted.



Powderpost beetle, *Lyctus brunneus*, adult (A) and larva (B). Typical exit hole (C).
Photos: **(A)** Lycanus, inaturalist.org, CC-BY-NC. **(B)** PaDIL, bugwood.org. **(C)** Michael. F. Potter, uky.edu.

Description

Lyctinae (True Powderpost Beetles)

Lyctus is the most common genus of true powderpost beetle in Arkansas, but other Lyctinae species may also be found here, as they are often unknowingly moved inside of wood furniture and other products. Adult beetles are typically small (roughly 1/32 - 1/8 inch in length), slender, and flattened. Color varies from reddish-brown to dark brown to deep black. A primary identifying trait is their visible head when viewed from above, and antennae that end in a distinct two-segmented club. Larvae are cream-colored with a darker head capsule, and often assume a C-shaped posture, but are rarely encountered except when wood is being sawn. They prefer dry hardwoods with high starch content, such as ash and oak, as well as bamboo products. They are rare in softwoods. Exit holes are small and round; visible frass is fine and powdery.

Bostrichidae (False powderpost beetles, horned powderpost beetles, auger beetles)

Adults are typically larger (1/8 - 3/8 inch long) with cylindrical, reddish-orange, dark brown or black bodies. The pronotum (upper section of the thorax) is arched forward into a prominent, hood-like structure that completely conceals the head when viewed from the top. Bodies may feature rough bumps or spikes. Antennae often feature 3-4 enlarged, saw-toothed segments at the tips. Larvae appear cream-colored and C-shaped. They prefer hardwoods, but will occasionally attack softwoods. Most species only infest fresh wood, and will not re-infest seasoned timbers. Therefore, damage is usually observed from species that were already in the wood before it was dried and milled for use. Exit tunnels are round, and tightly packed with frass made of coarse particles that tend to stick together.

Anobiinae (Deathwatch / Furniture Beetles)

These beetles are characterized by an elongated, cylindrical shape. Adults are small (1/16 - 1/8 inch long) and reddish-brown to dark brown. Similar to false powderpost beetles, their heads point downward beneath a pronounced thoracic hood; however, their 11-segmented antennae lack a distinct club. Larvae are C-shaped and creamy-white to pale pink. Their frass consists of fine oval pellets that feel gritty when rubbed between the fingers. They attack both hardwoods and rough-surfaced softwoods, and prefer sapwood. They are noted for the habit of tapping their heads or jaws against the insides of tunnels to attract mates. Historically, this faint rhythmic tapping became noticeable in quiet rooms, while people kept vigil over sick or dying loved ones (a “deathwatch”), giving these beetles their nickname. Their other name, furniture beetle, comes from their habit of emerging from furniture items, sometimes after many years of use in a home.

***Lichenophanes bicornis* (Bostrichidae)**
Photo: Mike Quinn, iNaturalist.org (CC-BY-NC).

***Anobium punctatum* (Anobiinae)**
Photo: Tomasz, stock.adobe.com.

Life Cycle

Adults emerge from the wood primarily between late winter and early summer to locate mates. The adult lifespan is fleeting, typically lasting only a few weeks. Mated females search for bare, unsealed wood surfaces to deposit their eggs. **Lyctids** inject their eggs into the exposed, open pores of hardwood species. **Bostrichids** and **Anobiids** lay their eggs inside rough surface crevices, cracks, or previously abandoned exit holes.

Immediately after hatching, larvae burrow into the wood core. This hidden tunneling phase is when structural damage occurs. The larval stage represents the vast majority of the beetle's life, which varies highly by species and conditions. Dry, unfavorable environmental conditions can stretch this phase into multiple years. Anecdotal reports suggest some beetles have emerged from finished furniture items that have been in use for more than 20 years. When mature, larvae migrate toward the outer edge of the wood to construct a pupal chamber. Following pupation, the adults chew a clean, circular exit hole to emerge into the open air.

The nutritional and environmental demands vary considerably by species. Unlike termites, Lyctid and Bostritchid larvae lack the ability to digest cellulose. They subsist on the starch, proteins, and soluble sugars found within the wood cells. Because starch levels are highest in freshly seasoned lumber and degrade naturally over time, Lyctids prefer relatively new wood and rarely reinfest older timbers. Anobiids, however, possess enzymes that break down cellulose, allowing them to successfully colonize and damage older, seasoned structural timbers.

Wood moisture affects larval survival. Lyctids are highly adapted to dry environments and can mature in wood with a moisture content as low as 6%. Anobiids require much higher moisture levels, failing to survive if the wood moisture drops below 13% to 15%. Optimal growth for most powderpost species occurs when wood moisture stays between 10% and 20%.

Detection

Old wood may show signs of previous infestation, but in most cases, seasoned wood will not be reinfested. The exception is Anobiids, which feed on cellulose, and so can reinfest seasoned wood and timbers. Active infestations are indicated by the presence of pale, fresh powder accumulating directly beneath or sifting out of the exit holes. To test for ongoing activity, clear away all existing dust, paint over or seal the current holes, and re-examine the area after several weeks to look for newly bored holes or fresh powder deposits. See Table 1 for a comparison of diagnostic characteristics. An observer must determine whether an infestation is currently active before choosing control strategies. Because these beetles accumulate damage slowly over months and years, structural failure is rarely immediate, providing ample time to plan and implement a targeted management strategy.

Integrated Pest Control Tactics

Prevention

Prevention is the best tactic to avoid damage from powderpost beetles. Fresh timber should be debarked soon after harvesting to reduce opportunities for egg laying. Proper kiln drying of lumber will kill beetles already in the wood, but will not prevent later infestation by some Anobiid species. Inspect milled lumber before purchase, and store in a low-humidity environment. Firewood should be stacked away from outer walls of homes, and brought indoors just prior to immediate burning.

Environmental Management

For Anobiid infestations in damp basements or crawlspaces, reducing humidity is critical for preventing continued reinfestations. Homeowners can install a thick plastic vapor barrier over exposed dirt floors, improve ventilation and foundation airflow, or install a dehumidifier. Keeping wood moisture consistently below 12% effectively disrupts the larval life cycle.

Female beetles are usually unable to deposit eggs on surfaces treated with paint, varnish, wax or polyurethane because these coatings fill open pores and crevices required for oviposition. While larvae already inside the wood will still complete their development and chew exit holes, the sealed surface prevents subsequent generations from reinfesting the material. If damage is new, exit holes should not have stain, paint or other sealant visible inside. Old damage will have traces of these sealants inside the holes, because they were applied after beetles previously emerged.

If the beetle activity is limited to a small, localized area (such as a few planks of flooring or a single piece of trim) physically removing and replacing the affected wood may be the most practical and economical fix.

Small, valuable items like wooden frames, antiques, or small decor can be deinfested by sealing them in plastic and utilizing a subzero freezer maintained at or below 0°F for several weeks. A rapid drop in temperature is required to overcome the larvae's cold tolerance.

Kiln-drying larger timber and slabs of wood is the most effective way to kill all species of wood-infesting insects. The internal core temperature of the wood must be maintained between 130-150°F for a sustained period to kill all larvae and reduce moisture.

Chemical Treatments

Penetrating borate solutions (such as disodium octaborate tetrahydrate) offer an effective, low-toxicity treatment for raw, unsealed wood. When applied to bare lumber, the borate solution diffuses into the outer layers of the wood, acting as a stomach poison that eliminates larvae as they begin feed. These treatments cannot penetrate into sealed or painted surfaces; old finishes must be removed before application. Likewise, surface treatments do not halt larval development deep within the wood, and may not prevent surface damage upon exiting. These treatments are mainly used to prevent subsequent generations of wood-boring beetles from becoming established.

Synthetic pyrethroid sprays (such as permethrin or cyfluthrin) can be applied to raw structural timbers. These formulas primarily target emerging adults or newly hatched larvae trying to enter the wood, but do little to eliminate deeply embedded larvae.

For severe, widespread infestations throughout a home's structural framing, or for high-value furniture where stripping the finish is not practical, professional gas fumigation using a penetrating agent (such as sulfuryl fluoride) may be necessary. This treatment must be administered by a professional, and can therefore be potentially expensive. The process eliminates all life stages, but provides no ongoing protection against future infestations once the gas dissipates.

Sources

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Table 1.

Comparison of habits of various groups of small wood-destroying beetles.

Beetle group	Common name	Typical length of larval stage	Maximum length of larval stage	Primary nutrient source	Wood preference	Susceptible	Frass texture	Exit hole diameter
Lyctinae	True powderpost beetles	9 to 12 months	2 to 5 years	Starch & sugar	New hardwoods only (large pores)	Sapwood only	Fine (like talc)	1/32 to 1/16 inch
Bostrichidae	False powderpost beetles, Auger beetles	1 year	2 to 5 years	Starch & protein	New hardwoods & some softwoods	Heartwood & sapwood (in high-humidity areas)	Meal-like, tightly packed	1/8 to 3/8 inch
Anobiinae	Furniture Beetles, Deathwatch Beetles	2 to 3 years	10 to 20+ years	Cellulose	Old or new hardwoods & softwoods	Sapwood only	Gritty (like cornmeal)	1/16 to 1/8 inch