

# Wood-boring Beetles of Structures



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**S**everal kinds of beetles tunnel through wood. When their larvae tunnel through structural wood, they can weaken it. The adults may also ruin the appearance of wood by creating holes in its surfaces.

Wood-boring beetles come from various insect families. They vary in size, damage and wood preference. Infestations can be managed, but it is critical to identify the beetles accurately because the management options vary by species.

## Detecting an infestation

The presence of adult wood-boring beetles may or may not indicate an infestation. Adult beetles are attracted to lights, windows, and doorways where they may accumulate.

Several signs can indicate an infestation:

- The holes that beetles leave behind when they emerge from wood.
- The presence of powdery material called frass which is a mixture of wood fragments and excrement. This frass usually piles below the holes or collects in structural cracks. It can be very fine to coarse, depending on the beetle species.
- Stained wood or blistered wood surfaces caused by larvae tunneling just below the surface.
- Audible rasping or ticking sounds made by the larvae while chewing on wood.

## Identify the beetle

Gather the following information to identify the beetle infesting your wood (Table 1):

- Note the color, size, and shape of the larva and/or adult.
- Determine whether the wood is hardwood or softwood.
- Note the size and shape of the exit holes.
- Examine the texture and location of the frass (Fig.1).

Some beetles re-infest wood, but most complete their development and lay their eggs in new wood.

Adult wood-boring beetles range from less than  $\frac{1}{8}$  inch to more than 2 inches long depending on the family. Many are dark colored; others are metallic blue or green, or yellow or red striped.

If you find adult beetles, look for holes or damaged wood to find the infested area. Wood-boring



**Figure 1.** Frass from wood boring beetles. Photo by Wizzie Brown.

beetle larvae, or grubs, usually remain inside the wood. Larvae can be tiny to more than 2 inches long (Fig. 2). They are elongated, segmented, soft, fleshy, and white to cream colored. They have a distinct brownish, hardened head capsule. Grubs may be cylindrical or flattened.



**Figure 2.** Round-headed wood borer larvae. Photo by Sonja Swinger.

The holes that wood-boring beetles make are usually round, but some species leave semicircular or oval holes. The shape and size of the hole can help identify the beetle species.

The texture and location of frass can indicate different types of beetles. Frass can be packed into the tunnels or extruded through exit holes. Whether it is powdery, pelletized, coarse, or shredded can help identify its source when no beetle specimen is available. A magnifying glass or microscope can help you examine frass more closely. Table 1 summarizes the characteristics of various wood-borer groups.

Beetles can be recognized and controlled based on whether they prefer soft or hardwood. Table 2 summarizes types of wood, the usual damage, the usual emergence sites, and the likelihood of reinfestation.

**Table 1.** Groups and characteristics of wood destroying beetles.

Group	Exit hole		Destructive stage	Typical length of life cycle	Frass characteristics
	Diameter	Shape			
<b>Lyctinae</b> (true powderpost beetles)	1/32 to 1/16 inch	Round	Larva	3 months–1 year	Flour or talc like; readily pours out of exit holes and cracks
<b>Anobiidae</b> (deathwatch beetles)	1/16 to 1/8 inch	Round	Larva	1–3 years	Fine to coarse; pellet shapes; usually a gritty quality; loose in tunnels; little at exit holes
<b>Bostrichidae</b> (false powderpost beetles)	1/8 to 3/8 inch	Round	Larva and adult	Usually 1 year	Fine to coarse; tightly packed; tends to stick together
<b>Ptinidae</b> (spider beetles)	1/16 to 1/12 inch	Round	Larva	Several months under favorable conditions	Fine and powdery; fills larval tunnels
<b>Curculionidae</b> (weevils, snout beetles)	1/32 to 1/16 inch	Round	Larva and adult	Varies with species	Powdery or granular dusts packed in irregular tunnels
<b>Buprestidae</b> (flatheaded borers)	1/32 to 1/2 inch	Oval	Larva	1–30 years	None at exit holes; coarse powder in tunnels
<b>Oedemeridae</b> (wharf borer)	1/4 inch	Round	Larva	About 1 year	Shredded and moist
<b>Cerambycidae</b> (roundheaded borers)					
Old house borer	1/4 inch	Oval	Larva	1–32 years (normally 3–10)	Tunnels filled with powdery dust often formed in pellets
Flat oak borer	1/16 to 1/12 inch	Slightly oval	Larva	1–several years	Tunnels packed with fine, flourlike dust and granules
Other roundheaded borers	1/8 to 1/2 inch	Round	Larva	Variable	Coarse and fibrous in tunnels
<b>Scolytidae</b> (bark beetles)	Less than 1/16 inch	Round	Adult and larva	2 months–1 year or more	Little or none at exit holes; very little or none in tunnels

For example, lyctid powder post beetles (Family: Bostrichidae) attack only seasoned hardwoods. These beetles threaten hardwood floors, wood trim, or furniture but would not be expected to attack softwood such as pine framing in a home. Deathwatch beetles, on the other hand, feed on seasoned soft and hardwoods.

Sometimes wood-boring beetles are attracted by lights but do not infest wood. More often, beetle infestations come from using wood that is already infested during the construction of a house or from a piece of furniture.

## Biology and habits of beetles

The life cycle of wood-boring beetles consists of egg, larva, pupa and adult. Only the larva and adult stages feed. Though adults of some species damage wood, the larvae do the most damage.

The length of the cycle from egg to adult of wood-boring beetles varies according to species and

environmental conditions. Some beetles complete a life cycle within a few months; others can live in wood as larvae for up to 30 years before emerging as adults. This type of infestation is difficult to detect and control.

One of the most significant wood-infesting beetles is the old house borer (Fig. 3). As member of the



**Figure 3.** Old house borer adult. Photo by Michael Merchant.

**Table 2.** Attack sites of wood-destroying beetles.

	Timbers attacked						Wood stage attacked			Adult emergence sites and damage in buildings				Reinfestation
	Unseasoned	Seasoned	Softwood	Hardwood	Sapwood	Heartwood	Living trees	Dying trees or recently felled logs	Seasoned lumber and wood products	Woodwork and/or flooring	Structural timbers	Furniture, tool handles, etc.	Firewood	
Powderpost beetles		X		X	X				X	X	X	X	X	Yes
Deathwatch beetles		X	X	X	X	X		X	X	X	X	X	*	Yes
False powderpost beetles	X	X	X	X	X			X	X	X	X	X	X	Rarely
Spider beetles		X	X	X				X	X	X	X			No
Snout beetles	X	X	X		X	X	X	X	X	X	X		X	Yes
Flatheaded borers	X	*	X	X	X	X	X	X	*	X	X	*	X	No
Wharf borer		X	X	X	X	X								Yes
Roundheaded borers														
1. Old house borer		X	X		X				X	X	X			Yes
2. Flat oak borer		X		X	X	X			X	X				No
3. Other roundheaded borers	X		X	X	X	X	X	X	X	X	X	*	X	No
Bark beetles	X	**	X	X	X	X	X	X	*		X	X	X	No
Timber worms	X			X			X	X					X	No

\*Possible    \*\*Rarely



**Figure 4.** Old house borer damage. Photo by Michael Merchant.

roundheaded wood borer family, this beetle attacks softwoods by laying eggs in the crevices of freshly felled timber or wood in lumberyards (Fig. 4). It will reinfest and is often found in homes that have been built using infested wood.

You may not need to treat beetles that do not reinfest structural timbers, such as flatheaded borers, roundheaded wood borers, and bark beetles. These insects are found shortly after a structure is built. Adults of these species generally emerge within a few years after construction and normally do not reinfest seasoned structural wood.

## Prevent infestations

Preventing beetle infestations and damage starts when trees are harvested. Bark should be removed from felled timber quickly to keep beetles from laying eggs there. Timber should be removed from the forest quickly and allowed to dry. Kiln drying will kill beetles, but they may reinfest the dried wood when it takes on moisture from the environment.

Most types of wood-boring beetles do not damage seasoned structural timbers or finished wood products that have been air or kiln dried to reduce moisture content. However, if infested wood is used in construction, beetles can emerge from structural timber, doors, flooring, molding, cabinetry, or paneling.

When you buy wood, inspect it for exit holes or other signs of infestation. Use structural wood and wood trim only if it has been properly kiln dried or chemically treated. Remember that beetles can still infest wood that is stored after being kiln-dried. Wood that is pressure treated with chemicals will resist infestation for many years.

Control moisture in your home to help avoid beetle infestations. Repair leaks and install vapor barriers, insulation, dehumidifiers and air conditioners. Most wood infesting beetles cannot develop in wood that contains less than 15 percent moisture. Low moisture will also help keep wood from rotting.

Keep a fresh coat of paint or varnish on all furniture or exposed wood in your home. Most beetle species will not infest wood with a finished surface.

Avoid bringing infested material into the home. Adult beetles can emerge from wood stored in the home and infest structural wood or unfinished furniture. Stack firewood well away from your home and never against its outer walls. Bring in only firewood that will be used immediately.

Inspect antique furniture, picture frames, bamboo products and other wooden items before buying them. Properly treat any item that has borer holes, larval infestations, or frass before placing it in your home or in storage.

## Eliminate infestations

After identifying the offending beetle, determine the extent of the damage and evaluate the structural characteristics of the infested item or building.

Beetle management options include replacing infested wood, killing the beetles with heat or cold, treating the wood surfaces with insecticides, or fumigating the structure. If the infestation is limited, remove or replace structural wood or furniture where economically feasible. Replacing infested wood keeps the infestation from spreading and eliminates visible damage.

Treat small home furnishings, wooden artifacts, or furniture by freezing or heating them. Maintain the infested wooden items at about 0 degrees F for at least 7 days to make sure that the beetles are killed. Some wood-boring beetles are resistant to cold temperatures and the length of exposure is important in killing these beetles.

To kill insects with heat, raise the internal temperature of wood to 140 to 150 degrees F for 2 to 4 hours. Wood that is more than 2 inches thick takes longer to reach the required internal temperature, so expect the treatment to take longer. The surface temperature of wood is usually higher than the internal temperature and high temperatures may damage certain items. In warm climates, the heat probably contributes to reduction of beetle infestations in attics.

