



# Structure-infesting wood-boring beetles



J. A. Jackman\*

Several kinds of beetles damage stored wood, structural timbers and other wood products. These beetles come from at least 12 families and vary greatly in size, wood preference, nature of damage and other habits. The tunneling activities of larvae and emergence of adults can weaken the structural strength of wood and may destroy its appearance.

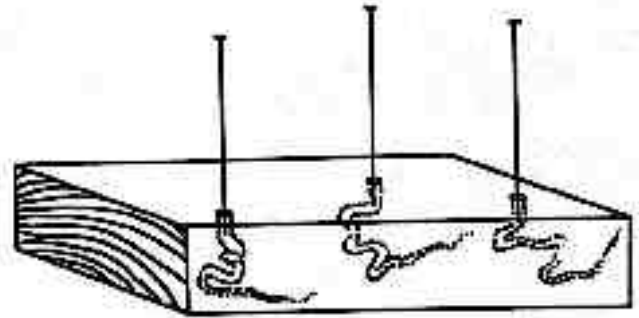
Proper identification of beetles or beetle damage is extremely important, because control measures vary according to species. Preventing beetle infestations is desirable, but once infestations are found, control measures are available.

Other insects attack and seriously damage wood. Their appearance and damage characteristics vary greatly. Refer to Extension publications B-6080, *Subterranean Termites*; L-1782, *Drywood Termites*; L-1783, *Carpenter Ants*; and L-1826, *Carpenter Bees*, for more information.

## Detection

There are several indicators that wood-boring beetles are present. Immature beetles tunneling in wood produce an audible rasping or ticking sound while chewing which is most often heard during quiet times at night. Another indication may be a blistering appearance on the wood caused by larvae tunneling just below the wood surface. While feeding, beetles often push powdery frass from holes they have constructed in the infested wood. This frass is piled below the holes or in cracks in structures. The consistency of the frass ranges from very fine to coarse, depending on the species. Exit or emergence holes in the wood, created by the adult beetle, also may be seen. Occasionally, wood staining or

the obvious presence of adult beetles will be noted. As adult beetles emerge in confined structures, they often are attracted to lights or windows and may accumulate at these locations.



Powderpost beetle tunneling.

## Identification

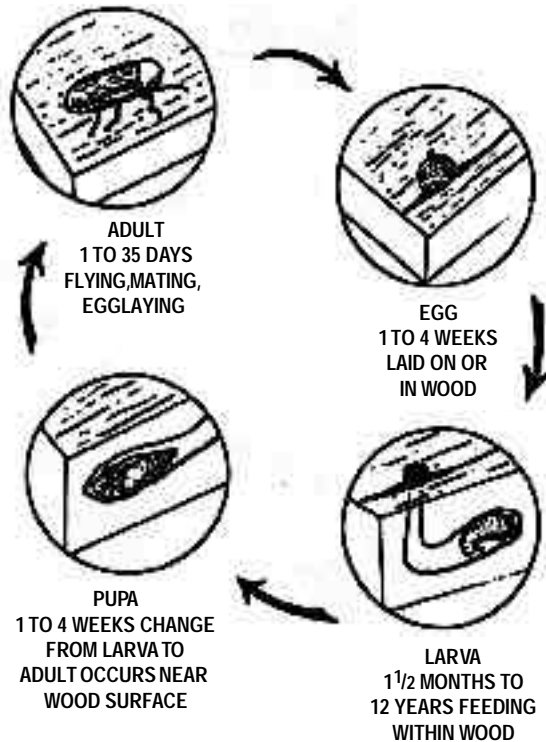
If beetle larvae, adults or other evidence of an infestation is discovered, obtain a correct identification of the beetle family or species involved. Wood-boring beetles range in size from under an eighth of an inch to more than 2 inches. Many of them are dark colored, but some are metallic blues and greens striped with yellow or red. If only adults are found, locate any emergence holes or damaged wood which identifies the infested area. Knowing the kind of wood, hardwood or softwood, can be helpful in identifying the beetle species involved. Frequently, wood-boring beetles enter homes accidentally because they are attracted by lights, but these cases are almost always nondamaging to property. Beetles may also emerge from infested wood brought into the house. Application of insecticides should be avoided unless actual infestation and damage are found and determined to be a potential threat to the structure.

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# Biology and habits

Wood-boring beetles have four life stages: egg, larva, pupa and adult. The eggs and pupae do not feed. Larvae, or grubs, are the main damaging stage, but in some species adults can damage wood. The majority of wood-boring beetles do not damage seasoned structural timbers or finished wood products. However, if infested wood is used in construction, beetles can emerge from finished furniture or buildings. Most species are unlikely to reinfest structures or breed in the home.

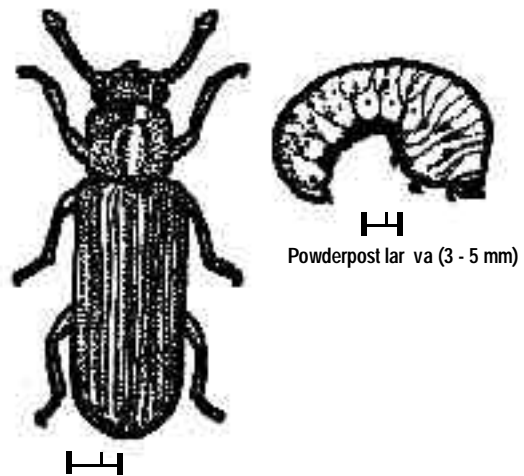
The length of the life cycle (egg to adult stage) of wood-boring beetles varies greatly. Some beetles complete a life cycle within a few months, while others have been known to live in wood as larvae for 30 years before emerging as adults. This complicates detection and control because it is difficult to assess the time an infestation has been present. The variation in biology for these beetles is outlined in Table 1. Emergence holes of wood-boring beetles are usually round, but some species produce semicircular or oval holes.



Typical wood-boring beetle life cycle .

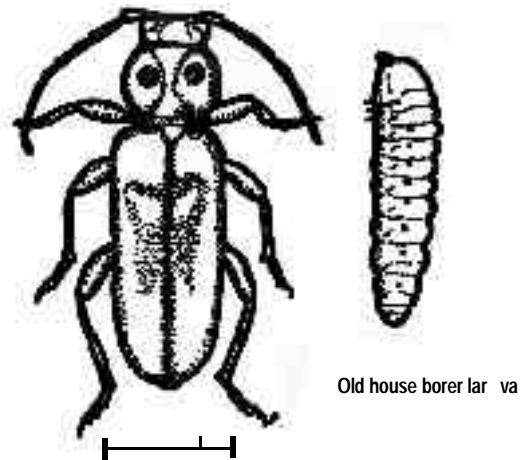
The type and location of frass is also characteristic of various beetle groups. Notice whether it is packed into the tunnels or extruded through exit holes. Also, note the texture (powdery, pelletized, coarse or shredded). All these characteristics can help identify beetles when no specimen is available. A hand lens is often helpful to determine the frass characteristics of wood-infesting beetles.

Often, various beetle groups can be recognized and control measures planned based on knowledge of their wood preferences. Table 2 summarizes the types of wood attacked, the usual damage or emergence sites in buildings and reinfestation capabilities. This table should help in planning appropriate control measures. For instance, the powderpost beetles attack only seasoned hardwoods, and are serious pests when they do. Thus, powderpost beetles found in hardwood floors or furniture would not be expected to attack the softwood ( e.g., pine) timbers in a home. On the other hand, deathwatch beetles can attack both softwoods and hardwoods, and generally feed on seasoned wood. Other beetle groups do not reinfest structural timbers, so control may be unnecessary.



Typical length of powderpost beetle adults (4 - 6 mm)

One of the most significant wood-infesting beetles is the old house borer, which generally attacks structural softwoods. Contrary to its name, it is often a pest in newer homes built with infested wood. Wood that is improperly kiln-dried or treated, or stored too long is susceptible to attack. This insect will readily reinfest structural timbers.



Typical length of old house borer adults (12 - 18 mm)

**Table 1. Biological characteristics of wood-destroying beetles.**

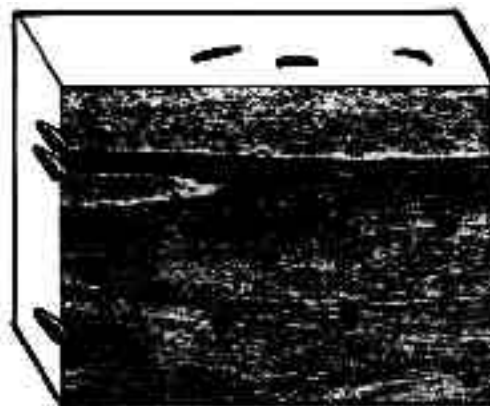
Group	Exit Hole		Destructive Stage	Typical Length of Life Cycle	Types of Frass
	Diameter	Shape			
<b>Lyctidae</b> (powderpost beetles)	1/32 to 1/16 inch	Round	Larvae	3 mo. to 1 year	Flour or talclike; readily pours out of exit holes and cracks.
<b>Anobidae</b> (deathwatch beetles)	1/16 to 1/8 inch	Round	Larvae	1 to 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	Larvae 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	Larvae	Several months under favorable conditions	Fine and powdery; fills larval tunnels.
<b>Curculionidae</b> (weevils, snout beetles)	1/32 to 1/16 inch	Round	Larvae 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	Larvae	1 to 30 years	None at exit holes; coarse powder in tunnels.
<b>Oedemeridae</b> (wharf borer)	1/4 inch	Round	Larvae	Approximately 1 year	Shredded and moist.
<b>Cerambycidae</b> (roundheaded borers)					
1. old house borer	1/4 inch	Oval	Larvae	1 to 32 years (normally 3 to 10)	Tunnels filled with powdery dust often formed in pellets.
2. flat oak borer	1/16 to 1/12 inch	Slightly Oval	Larvae	1 to several years	Tunnels packed with fine flourlike dust and granules.
3. other roundheaded borers	1/8 to 1/2 inch	Round	Larvae	Variable	Coarse and fibry in tunnels.
<b>Scolytide</b> (bark beetles)	Less than 1/16 inch	Round	Adult and Larvae	2 mo. to 1 year or more	Little or none at exit holes. Very little or none in tunnels.
<b>Brentidae, Lymexylidae, and Tenebrionidae</b> (timber worms)	Less than 1/32 to 1/8 inch	Round	Larvae	Unknown (probably several years)	Galleries free of frass and not stained.

The majority of flatheaded borers, roundheaded wood borers, and bark beetles are found shortly after a structure is built. Adults of these species generally will emerge within a few years after a building has been constructed. These beetles do not normally reinfest structural wood. There are a few exceptions, of course, such as the old house borer which is a member of the roundheaded wood borer family.

## Prevention

Prevention is the best way to avoid damage caused by wood-destroying beetles. Several standard procedures to eliminate or avoid these problems are available.

Evaluate wood closely before purchase. Purchase only structural wood and wood trim that has been properly kiln-dried or chemically treated. Proper kiln drying will eliminate any



Powderpost beetle damage.

infestation. However, infestations may still occur in wood which is stored after being kiln-dried. Commercially pressure-treated wood will resist infestation for many years.

Carefully inspect antique furniture, picture frames, bamboo products and other wood items before buying them. Consider any evidence of fresh emergence holes, larval infestations and extruding frass to be an active infestation. Treat these properly before placing them in your home or in storage.

Employ moisture control methods, such as vapor barriers and insulation whenever possible. This will help prevent decay that can aggravate wood-boring beetle problems. Most wood-infesting beetles cannot develop in wood that has a moisture content below 10 to 15 percent.

Avoid other sources of infestation such as indoor storage of fireplace wood. Store fireplace wood as far from the home as possible, and only bring in wood which will be used immediately. Adult beetles can emerge from wood temporarily stored in the home and infest structural wood or furniture or become a nuisance.

Maintain a fresh coat of paint or varnish on all furniture or exposed wood in your home. Most wood-infesting beetle species will not reinfest wood that is painted, varnished, waxed, or has some other type of finished surface. Obviously, much of the structural timber is always exposed and untreated by necessity.

## Control

There are several options available for controlling wood-boring beetles. Identification of the beetle or beetle group involved, the extent of the damage, and an evaluation of the structural characteristics of the infested building are necessary to properly plan any control efforts. Keep in mind that some beetle groups will not reinfest structural timbers so control procedures are not needed. Most control programs are limited to temperature treatment, replacing infested wood, spot treatment with residual insecticides or fumigation.

Small home furnishings, wooden artifacts or furniture may be treated by freezing or heating. It is necessary to maintain the wooden items at approximately 0 degrees F for several weeks to eliminate infestation, because many wood-boring beetles are resistant to cold temperatures. Alternately, some control programs might be aimed at increasing temperatures to high levels (e.g., 140 to 150 degrees F for 2 to 4 hours). Extremely high temperatures probably aid in reducing beetle infestations in many attics. Be

aware that surface temperatures of wood seldom reflect the internal temperature. It is necessary to hold the wood at the desired temperature for an extended time for the internal temperature to reach the desired level.

When an infestation is localized, replacing infested wood is a viable option. Damaged structural wood or furniture should be removed and replaced whenever it is economically feasible.

Pesticide treatments for wood-boring beetles are best done by pest control operators. A localized infestation may be treated by spraying or brushing on residual insecticides. Proper treatments may be effective for 10 years or more. However, this only affects adults that emerge from the wood or attempt to reinfest it. Larval development beneath the wood surface often continues. Also, surface treatments generally do not control infestations of deep-boring beetles such as the old house borer. Products containing chlorpyrifos, borate, permethrin, cypermethrin and cyfluthrin are registered for wood-boring beetle control. Applications are typically made as a water emulsion applied twice, the second time before the first application dries completely. Applications to the unfinished wood surfaces will allow some penetration into the wood. However, many types of wood finishes—paint, varnish, wax—do not permit insecticide penetration, or could be damaged by chemical interaction. If warranted, finishes may have to be removed before treatment.

Fumigation is the most reliable and effective method of eliminating wood-boring beetles. A toxic gas penetrates beneath the wood's surface to kill the developmental stages of the beetle. However, fumigation will not leave any residual chemical on the wood surface to prevent subsequent infestation. Because it is a costly, highly technical and hazardous process, fumigation must be left to pest control operators experienced in this technique. Refer to Extension publication L-1785, *How to Select a Termite Control Service*, for more information.

Insecticide label clearances are subject to change and changes may have occurred since this publication was printed. The pesticide USER is always responsible for the effects of pesticides on his own plants or household goods as well as problems caused by drift from his property to other property or plants. *Always read and follow carefully the instructions on the container label.*



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

	Timbers Attacked						Wood Stage Attacked			Adult Emergence Sites & Damage in Buildings				Reinfestation
	Unseasoned	Seasoned	Softwood	Hardwood	Sapwood	Heartwood	Living Trees	Dying Trees or Recently Felled Logs	Seasonal 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 borers		x	x	x	x	x								yes
Roundheaded borers														
1. Old house borers		x	x		x				x	x	x			yes
2. Flat oak borers		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

Previous version of this publication was written by J. A. Jackman and P. J. Hamman.

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