Identification of Wood Destroying Beetles and Their Damage

SUBFAMILY LYCTINAE
True Powder Post Beetle

FAMILY ANOBIIDAE
Deathwatch or Furniture Beetle

FAMILY BOSTRICHIDAE
False Powder Post Beetle

FAMILY CERAMBYCIDAE
Old House Borer

Wood Destroying Beetles

- Many different species and families of beetles attack wood
- Most are not considered pests
  - Their pest status depends on whether they can re-infest dry seasoned wood
- In order of importance, these are the most important beetles that attack and re-infest dry structural wood are:
  - Powder post beetles (family Anobiidae)
  - Old house borer (*Hylotrupes bajulus*)
  - Powder post beetles (subfamily Lyctinae of family Bostrichidae)
  - Powder post beetles (family Bostrichidae)

Reinfesting Wood Destroying Beetles

Remember the acronym **LABO:**

- **L** yctinae – True Powder Post Beetle
- **A** nobiidae – Deathwatch & Furniture Beetles
- **B** ostrichidae – False Powder Post Beetle
- **O** ld House Borer – Cerambycidae – Long horned wood borer

Characteristics used to identify the wood destroying beetle responsible for infesting dry structural wood

- Time of year emerged from structural wood
- Size & shape of exit hole (LABO)
- Frass (sawdust)
- Type of wood (hardwood or softwood)
- Age of wood (new or old)
- Size of insect (LABO)
- Moisture of wood
- Type of wood product infested

Time of the Year Emergence Occurs

- L yctid = emerges **December to early Spring**
- A nobiid = emerges **April to June**
- B ostrichid = who cares, we rarely ever see'em
- O d House Borer = emerges **June to August**

Size & Shape of Exit Hole (LABO)

Remember the acronym **LABO**

- L yctid = Little Lyctid
  (**Round shape** & **1/32" to 1/16"** in diameter)
- A nobiid = Average Anobiid
  (**Round shape** & **1/16" to 1/8"** in diameter)
- B ostrichid = Big Bostrichid
  (**Round shape** & **1/8" to 3/8"** in diameter)

O ld House Borer = Oversized Old House Borer
(**Oval shape** and **¼" to 3/8"** in diameter)

Feel & Consistency of Frass

- Lyctid = **very fine** (like flour or baby powder) & <u>loosely packed</u>

- Anobiid = **gritty** (fine powder and small, bun-shaped pellets, <u>loosely packed</u>

- Bostrichid = **fine to coarse** powder, <u>tightly packed</u>

- Old House Borer = **very fine powder and tiny pellets**, <u>tightly packed</u> in galleries

Hardwood trees (oak & ash) loose their leaves in Fall & Winter

Type and Age of Wood

Softwood trees (pine & spruce) don't loose their needles in Fall & Winter

New = 10 years or less since tree was fell **Old** = > 10 years from when tree was fell

- Lyctid = usually **new**, but occasionally old **hardwood**

- Anobiid = usually **old**, but occasionally new **softwood & hardwood**

- Bostrichid = **new softwood & hardwood**

- Old House Borer = **usually new**, but occasionally old **softwood**

Size of the Reinfesting Wood Destroying Beetle Adult

Remember the acronym **LABO**

L yctid = Little Lyctid = up to ¼" in length

A nobiid = Average Anobiid = up to **1/3"** in length

B ostrichid = Big Bostrichid = variable, **1/8" to ¾"** in length

O ld House Borer = Oversized Old House Borer = from **5/8"** to **1¼"** in length (**3/4"**)

Size of the Reinfesting Wood Destroying Beetle Larva

Remember the acronym **LABO**

- **L** ittle Lyctid = up to **¼**" in length
- **A** verage Anobiid = up to **1/2"** in length
- **B** ig Bostrichid = variable, **1/2"** to **1"** in length
- **O** ver-sized Old House Borer = up to **1¼"** to **1½"** in length

Moisture Requirements of Wood Destroying Beetles in Structural Wood

- Lyctid = **6%** to **30%**

- Anobiid = **13%** to **30%**

- Bostrichid = **13%** to **30%**, some species higher

- Old House Borer = at least **13%**

Types of Wood Products Attacked By Reinfesting Wood Destroying Beetles

- Lyctid = lumber and newly manufactured products (cabinets & flooring), usually found inside structures
- Anobiid = Some manufactured products, structural timbers and lumber (most often found in crawl spaces)
- Bostrichid = Manufactured products, structural timbers and lumber
- Old House Borer = Structural timbers and lumber

Life Cycle and Habits of Lyctid PPBs
True Powder Post Beetles

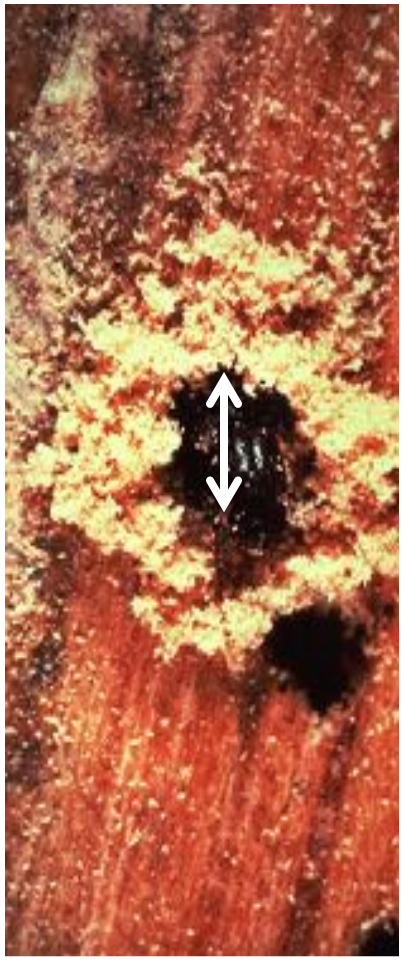
- Adults are active in **late winter** to **early spring**
- They infest **hardwoods** only!
- They prefer **new** wood, less than 10 yrs. old, but occasionally attack old wood.
- Development usually takes about **1 year**
- Larva up to **¼”** long, adults up to **¼”** long
- Their frass is **fine**, feels like flour or talcum powder and is loosely packed
- They require a high starch content in wood. Starch content decreases with the age of the wood, so sometimes they fail to attack old hardwoods

Identification of Adult True Powder Post Beetles

- The adult beetle is approximately ¼" in length
- The **head** of the adult beetle **is visible from above**, while the heads of both the Anobiid PPB and the Bostrichid PPB are hidden under the pronotum.
- The True PPB is about the size of a stored product beetle, but the **last 2 segments of the antennae** of the True PPB are enlarged (**clubbed**).

Identification of the True PPB from its frass

- True PPBs emerge from **1/16”** to **1/32”** diameter **round exit holes** in hardwoods
- Their frass (sawdust) is very fine and loose around the exit hole. It feels like talcum powder or flour.



True PPB infestation and damage to wood flooring

- Lyctids are not found in a lot of homes.

- They infest bamboo, oak, and other hardwood flooring and sometimes hardwood cabinets.

- Most often they emerge from the flooring within months of when the flooring was installed. The flooring should be removed, thrown away and replaced or fumigated and reinstalled.

Size & Identification of True PPB Larvae

- Lyctid larvae are **C-shaped**, up to **¼”** long, and have an enlarged thorax with legs that have **long claws**

Economic Importance of True PPBs

- They only attack **hardwoods**.
- Since homes are built of softwoods (pines & furs), Lyctids are no threat to the structural integrity of our customers' homes.
- Hardwood flooring and furniture is sometimes infested.
- It can be removed and replaced or removed, fumigated in a vault or a van, and returned to the home.
- Fumigation of the home is seldom warranted

Life Cycle and Habits of Anobiid PPBs
<u>Deathwatch & Furniture Beetles</u>

- They emerge, mate, and lay eggs in **April - June**
- Larvae develop in 1-5 years, commonly every 2 or 3 years in GA
- Larvae are up to **½”** long, adults up to **1/3**” long
- They tend to prefer **old wood** - 10 yrs. or older
- Their frass feels **gritty** & streams out from emergence holes
- They infest both **softwoods** & hardwoods
- They are found east of Rockies (California) and are found most commonly in Southeast (because of high moisture)

Life Cycle and Habits of Anobiid PPBs (continued)

- Anobiids require moisture levels of **13% to 30%** in wood to develop
- That's why they are often confined to the crawl space
- They may infest wood inside the home if it is a "lake home" and the heating/AC unit is not used that often.
- Foreclosed homes that sit unoccupied for a long time without the heat or AC may develop Anobiid infestations.

Identification of Adult Anobiid PPBs

- Adult Anobiid PPBs generally have parallel lines running lengthwise on their elytra and their head is hidden beneath

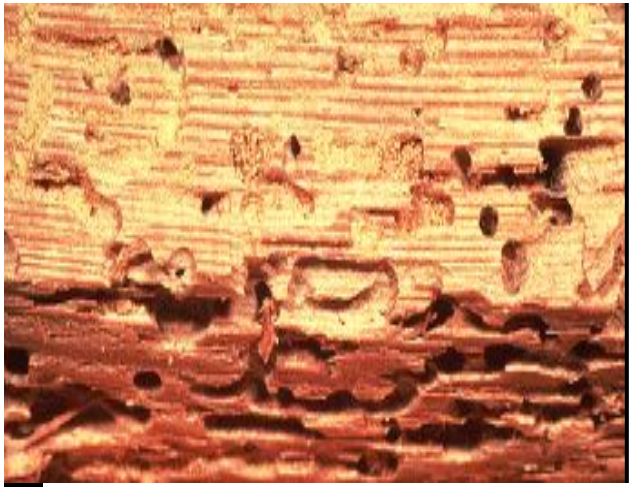
Frass streams down from exit holes in crawl space wood when PPBs exit

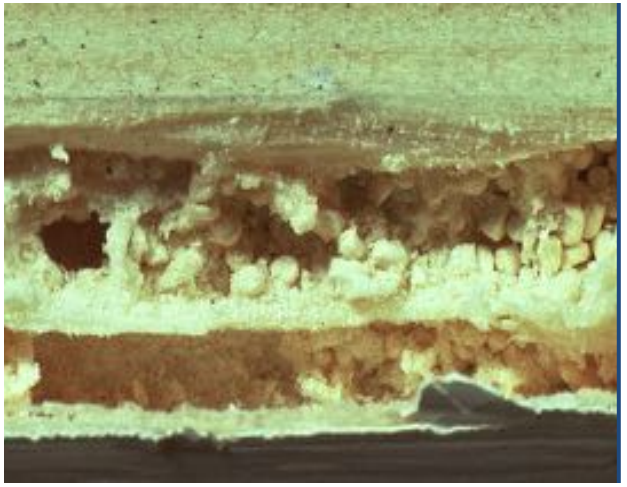
- Exit holes are **round** and are from **1/8”** to **1/16”** in diameter

- Anobiid frass often piles up on top of ductwork in the crawl space, falls on top of items stored in the crawl space, and gets caught in spider webs

Anobiid PPB frass feels "gritty"

- Anobiid larvae digest cellulose in wood with enzymes and they excrete bun-shaped pellets. They get mixed with the sawdust they produce as they bore through wood and it makes their **frass feels "gritty."**





Economic Importance of Anobiid PPBs

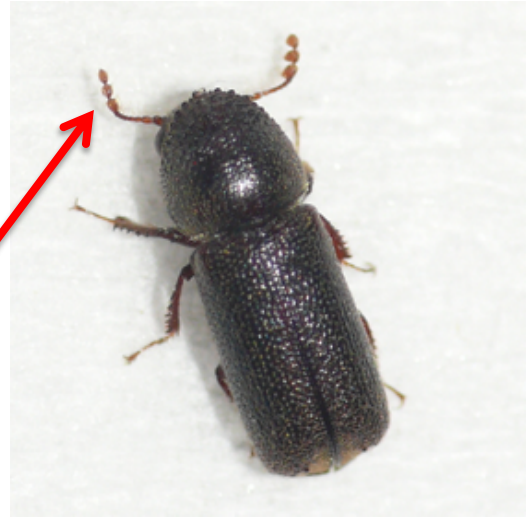
- They attack both **softwoods** and **hardwoods**.
- Since homes are built of softwoods (pines & furs), Anobiid PPBs can present a significant threat to the structural integrity of our customers' homes as well as their furniture and possessions.
- Hardwood flooring and furniture are occasionally infested.
- If Anobiid PPBs only infest structural wood below the 1st floor level of the home, a wood treatment with a Borate product will usually provide excellent control of PPBs in crawl space wood.
- Fumigation of the home is usually warranted whenever the PPB infestation is found above the 1st floor level of the home or is found on the exterior of the home…but when the exterior wood is wet, the fumigant may not penetrate the wood enough to kill the PPBs.

Life Cycle and Habits of Bostrichid PPBs
False Powder Post Beetles

- They prefer **new** wood, less than 10 years old
- They infest both **softwoods** and **hardwoods**
- Bostrichids are rarely found in homes in North America
- They **rarely re-infest** the home
- Often are found in bamboo or rattan furniture, Asian or Mexican woods

Identification of Adult Bostrichid PPBs
False Powder Post Beetles

- False PPBs are shaped more rectangular than oval.
- Their heads are hidden from above
- Their **antennae have 3 enlarged segments** (clubbed)



Both larval and adult Bostrichids eat wood

The Adult Bostrichid PPB makes **round exit holes** that are **1/8”** to **3/8”** in diameter as it emerges from the wood

The Bamboo Borer attacks bamboo & rattan furniture

The Black Polycaon beetle is native to California

- Adult false powder post beetles are dark brown or black, sometimes with reddish mouthparts, legs, and antennae. Adults of most species are about ¼" long, but one very abundant native California species, the black Polycaon, is **1½"** to **2"** long. The head of this Bostrichid beetle is visible from above. Its life cycle can take up to **20 years** to complete.

Economic Importance of Bostrichid PPBs

- Bostrichids rarely attack structural wood in the U.S.
- Flooring, furniture, and art objects are occasionally infested.
- Fumigation of infested furniture and art objects is occasionally warranted.

Life Cycle and Habits of the Old House Borer

- The Old House Borer is the only Cerambycid beetle that reinfests structures in the Southeastern U.S.
- OHBs emerge from wood, mate & lay eggs in **June - August**
- OHB larvae require from **3 to 12** years for development and mature larvae are up to **1½"** long

- Contrary to it's name, the OHB prefers **new wood** that is **less than 10 years old,** mostly due to the need for the larvae to be in wood with a higher resin content. Occasionally, they are found in old wood.
- OHB activity typically drops during the Winter
- OHBs are found primarily east of the Mississippi River

Identification of Adult Old House Borers

- The adult OHB beetle is about **5/8”** to **1”** in length from the tip of the head to the end of the abdomen.

- There are **two shiny black raised areas** on the pronotum and there are many fine gray hairs on the sides of pronotum

- There are **white chevron marks** on each elytra

Identification of Old House Borer Larvae

- The cream-colored larvae are up to 1½" in length. On each side of the head are three distinct, dark eyes (ocelli) arranged vertically behind the mouthparts.

Identification of Old House Borer Larvae

(referred to as Round headed borers)

- The larva, while chewing with its mandibles, makes a rasping or clicking sound (similar to the sound produced by clicking fingernails), often audible to the homeowner.

Identification of Old House Borer Damaged Wood

- Where the OHB larvae feed in wood, they leave **ripple-like ridges** that are parallel to each other

An enemy of log cabins!

Economic Importance of Old House Borers

- The majority of OHBs are generally found in thick timbers of a building. Very few ever have been located in wood less than one-inch thick.

- Most structural infestations are started by OHB larvae in the original construction timber.

- Most infestations remain localized where excessive wood moisture is found, in areas such as poorly vented attics and leaky roofs. Beetles will flourish, spread to other structural items and cause much damage in a short period of time.

Economic Importance of Old House Borers

(continued)

- Old House Borers can cause a significant amount of damage in a short period of time.
- Sometimes OHB infestation and damage in an attic goes unnoticed for a long period of time.
- Fumigation of lumber or structures is the only absolute method of eliminating old house borer infestations, particularly in structures.
- The fumigation of a structure with Vikane gas fumigant readily penetrates structural wood and can kills all stages of the Old House Borer.

Comparison of Reinfesting Wood Destroying Beetles

Type of Beetle	LYCTID	ANOBIID	BOSTRICHID	CERAMBYCID
Type & Age of Wood Attacked	Hardwoods only usually New < 10 years old	Soft & Hardwoods Old > 10 yrs old	Soft & Hardwoods New < 10 yrs old	Softwoods only usually New <10 yrs. old
Type of Product	Lumber, usually newly manufactured products & flooring	Manufactured products, structural timbers & lumber	Manufactured products structural timbers & lumber	Structural timbers and lumber
Evidence of Damage (Holes & Frass)	Round holes: 1/32" - 1/16" Frass is fine, like talcum powder, loosely packed	Round Holes: 1/16" - 1/8" Frass feels gritty/coarse loosely packed in galleries	Round Holes: 1/8" - 3/8" Frass is fine to coarse & more tightly packed	Oval Holes: 1/4" - 3/8" Frass is very fine powder with tiny pellets tightly packed in galleries
Wood Moisture Content	6% to 30%	13% to 30%	6% to 30% (some species higher)	At least 13%
Length of Life Cycle	1 year (Maybe 3 months)	Usually 2 to 3 years (1 to 5 years or longer)	Usually 1 year	3 to 12 years

Damage by Common Reinfesting Wood Boring Beetles

Insect Type	Wood Type	Age of Wood	Shape of Exit Holes	Size of Exit Holes	Reinfesting?
Lyctid Beetles	Hardwoods	Usually New, Occasionally Old	Round	1/32" to 1/16"	Yes
Anobiid Beetles	Softwoods & Hardwoods	Usually Old, Occasionally New	Round	1/16' to 1/8"	Yes
Bostrichid Beetles	Softwoods & Hardwoods	New	Round	1/8" to 3/8"	Rarely
Old House Borer	Softwoods	Usually New, Occasionally Old	Oval	1/4" to 3/8"	Yes

Now that we've learned about the reinfesting wood destroying beetles…

Let's learn about other non-reinfesting wood boring beetles.

- There are many beetles that infest wood. Many of them only infest wet wood (live trees or recently cut trees) and will not reinfest dry structural wood. In most cases, they will not need to be treated.

- You need to be able to distinguish between reinfesting wood boring beetles (which usually require treatment) and non-reinfesting wood boring beetles (which usually do <u>not</u> require treatment. Sometimes, that is very difficult.

The Non-reinfesting Wood Boring Insects

- Sometimes homes are built with wood that is not properly kiln-dried.
- The wood boring insects are already in the tree before it is cut and used in homes.
- The end result may be that non-reinfesting wood boring beetles emerge from the wood after the house is built. In most cases, treatment is <u>not</u> required.

Identifying the Wood Destroying Insect

- Since we normally don't find the adult or larva of the wood destroying insect to identify, we must rely on other characteristics to determine whether it is a non-reinfesting wood boring insect that does not require treatment…and that's where the fun begins!

- So, here's all that you need to know about these other wood destroying insects that do not reinfest dry structural wood.

The Non-reinfesting Cerambycid Beetles
<u>Long-horned wood borers</u>

Non-reinfesting Cerambycid Beetles

- The adult beetles are called Long-horned wood borers because of their long antennae.

- Their larvae are called Round-headed borers because of their round heads.

Non-reinfesting Cerambycid Beetles

- Most Cerambycid beetles attack live, dead, or dying trees and do not reinfest dry structural wood of homes.
- They may emerge from newly built homes that have been constructed with lumber that has not been kiln-dried.
- Once they emerge, they will not reinfest the wood…unless it is significantly moist.
- Fumigation is generally not needed, nor recommended.

Non-reinfesting Buprestid Beetles
Metallic wood borers

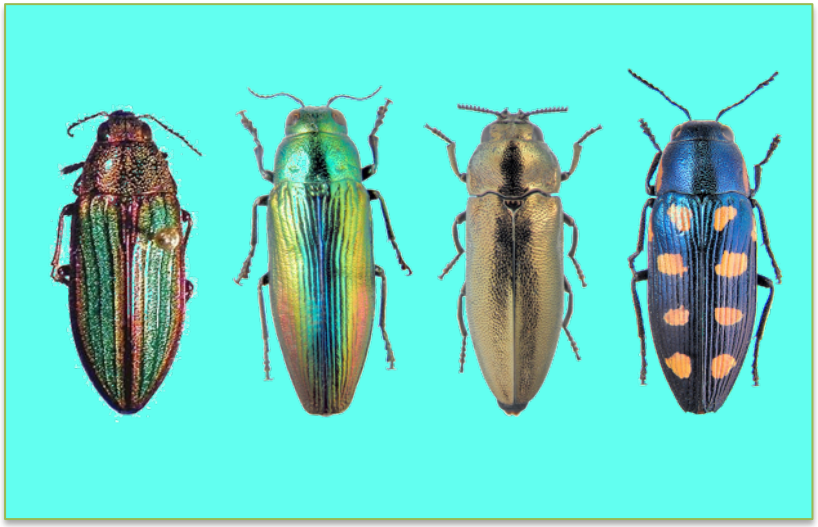
- They are called Metallic wood borers as adults because of their metallic-like color.

- They are called flat-headed borers as larvae because of the broad flattened-shape of the head of the larvae.

- They often are found under the bark of firewood.

Non-reinfesting Buprestid Beetles

- Metallic wood borers infest trees at the time of harvest before use in construction.



- A few Buprestids may have an extremely long life cycle, which may be as long as 51 years.
- They may emerge from newly built homes that have been constructed with lumber that has not been kiln-dried.
- They are not a re-infesting wood boring beetle unless the wood used is wet, occasionally found in log cabin homes.
- Fumigation is generally not needed, nor recommended… but that is up to the customer to decide.

Non-reinfesting Scolytid Beetles
Bark beetles

- They are called Bark beetles because as larvae, they feed on the underside of bark of dying, and dead trees.

- They are only 1 to 6 mm in size.

- They do not damage structural wood of homes and do not need to be controlled.

Non-reinfesting Scolytid Beetles

- The larvae make finger-like galleries at the interface between the sapwood and the bark, on the underside of the bark.

- They do not make galleries in the sapwood or heartwood of the tree, so they do not damage wood that will become structural wood.

- While feeding, they often transmit pathogens that may end up killing the tree.

Non-reinfesting Scolytid & Platypodid Beetles
<u>Ambrosia beetles</u>

- They are called Ambrosia beetles.
- They attack dead or dying trees and lay their eggs in the galleries they make.

- They do <u>not</u> damage structural wood of homes.
- <u>No</u> control is needed.

2 to several mm in length

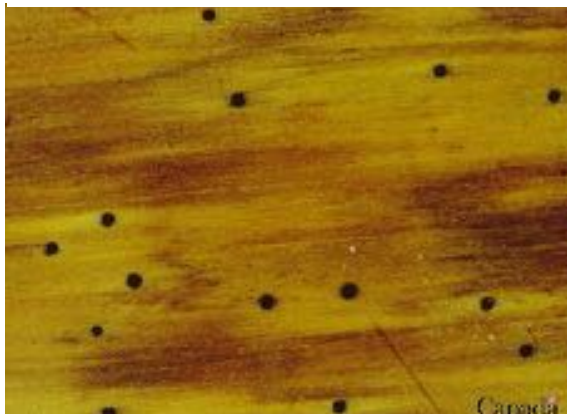
Ambrosia Beetles attack live trees

- Signs of Ambrosia Beetle infestation of a tree (it appears like toothpicks are sticking out from the tree)

- The female Ambrosia beetle tunnels in a live tree and makes galleries. She lays eggs in the galleries, carrying fungus spores.

- <u>The larva feeds on the fungus</u> which digest the wood, removing toxins from the tree and they mutually benefit.

Dark staining of the holes and galleries in wood are signs that Ambrosia beetles attacked the tree as it was dead or dying



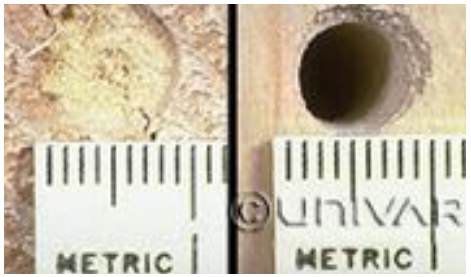
The Non-reinfesting Horntail
Family Siricidae - Order Hymenoptera

- The adult **Wood Wasp** or **Horntail** is named for the prominent ovipositor at the end of the female's abdomen.

- These wasps are also harmless and are common in conifer woods in July and August. The female drills a hole into fallen or damaged trunks to lay her eggs. The larvae develop inside the wood.

The Non-reinfesting Horntail

- Occasionally, the wood is used in homes without properly being kiln-dried.
- They emerge from the **¼" exit holes** of structural wood of homes as adults. but do not re-infest dry structural wood.
- Most of the times, they emerge from log homes.
- No treatment is recommended.



Families of Non-reinfesting Wood Boring Insects

- Family Cerambycidae - Long Horned Wood Boring Beetles
  (the Old House Borer is an exception)
  (larvae = round headed borers)

- Family Buprestidae - Metallic Wood Boring Beetles
  (larvae = flat headed borers)

- Family Scolytidae - Bark and Timber Beetles

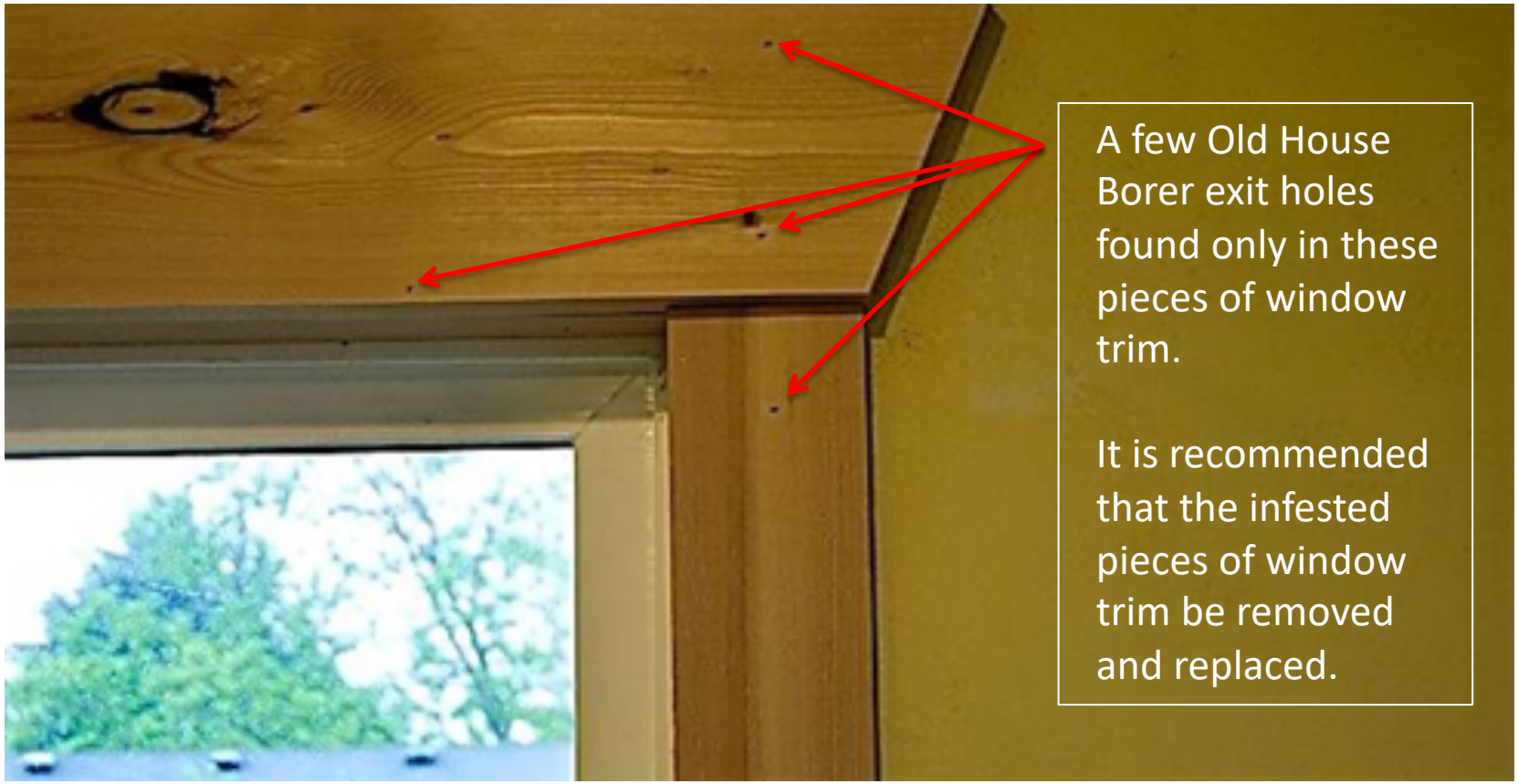
- Family Scolytidae & Platypodidae - Ambrosia Beetles

- Family Siricidae – Horntails (wood boring wasps)

Treatment Options for Wood Destroying Insects

- No treatment is recommended for these non-reinfesting wood boring beetles.
- Recommend that the firewood be removed from inside.

IPM Treatment Option for Powder Post Beetles or Old House Borers where infestation is limited to a few holes a couple of boards.



Obviously, one can't guaranty there isn't hidden infestation behind walls or that reinfestation will not occur!

Treatment Options for Powder Post Beetles

- If the infestation is <u>in flooring</u> and the flooring is less than 1 year old, I suggest that the owner of the home go back to the supplier of the flooring and ask for the flooring to be replaced "free of charge."

- If the flooring is older than 1 year old, I suggest that the flooring be replaced by the owner.

- If <u>cabinets</u> are infested, I recommend that they be removed and fumigated.

True Powder Post Beetles

Treatment Options for Powder Post Beetles

- If the infestation is widespread and/or heavy in hardwood paneling, expensive furniture, etc. and the price of fumigation is justified or the customer desires fumigation, I recommend that the entire structure be fumigated with Sulfuryl fluoride.

- If the infestation in furniture or in cabinets and is not widespread, I recommend that they be removed from the structure and fumigated with Sulfuryl fluoride in a chamber or vehicle.

True Powder Post Beetles

Treatment Options for Powder Post Beetles

- If the infestation is only <u>in the wood of the crawl space</u> (subflooring, joists, sill plates, headers, etc.), I recommend:

1. that the wood be treated with a Borate product in compliance with the label

1. that a Class 1 vapor retarder be placed over a minimum of 70% of the soil of the crawl space

3. and ventilation of the under-floor space between the bottom of the floor joists and earth meets the current requirements of the International Residential Building Code, the latest edition as adopted and amended by the Georgia Department of Community Affairs.

Deathwatch or Furniture Beetles

All the wood of the crawl space needs to be treated with a Borate product that is labeled for the control of powder post beetles!

Treatment Options for Powder Post Beetles

- If the infestation is <u>in the wood of the crawl space</u> (subflooring, joists, sill plates, headers, etc.) <u>and</u> either <u>on the inside</u> or <u>on the outside</u> of the structure, it is recommend:

1. that the structure be fumigated with Sulfuryl fluoride in compliance with the label

1. that a Class 1 vapor retarder be placed over a minimum of 70% of the soil of the crawl space

1. and ventilation of the under-floor space between the bottom of the floor joists and earth meets the current requirements of the International Residential Building Code, the latest edition as adopted and amended by the Georgia Department of Community Affairs.

Deathwatch or Furniture Beetles

If the infestation is in the wood of the crawl space (subflooring, joists, sill plates, headers, etc.) and either on the inside or on the outside of the structure, it is recommend that the structure be fumigated with Sulfuryl fluoride in compliance with the label, that a Class 1 vapor retarder be placed over a minimum of 70% of the soil of the crawl space and ventilation of the under-floor space between the bottom of the floor joists and earth meets the current requirements of the International Residential Building Code, the latest edition as adopted and amended by the Georgia Department of Community Affairs.

Treatment Options for Powder Post Beetles

- If there is no infestation in the wood of the crawl space, but the structure is infested either on the inside (1st floor or above) or on the outside of the structure, it is recommend that the structure be fumigated with Sulfuryl fluoride in compliance with the label.

Deathwatch or Furniture Beetles

If the infestation is either in the wood inside the structure (1st floor or above) or on the outside of the structure, it is recommend that the structure be fumigated with Sulfuryl fluoride in compliance with the label.

Treatment Options for the Old House Borer

If there is infestation <u>inside the crawl space</u> and it <u>is **very limited in scope**</u>, it is recommended that:

1. the **infested wood be removed** and that the structure be treated with a Borate product in compliance with the label
1. that a Class 1 vapor retarder be placed over a minimum of 70% of the soil of the crawl space
1. and ventilation of the under-floor space between the bottom of the floor joists and earth meets the current requirements of the International Residential Building Code, the latest edition as adopted and amended by the Georgia Department of Community Affairs.

Old House Borer

Obviously, one could <u>not</u> guaranty that the treatment would control the Old House Borer infestation, as some infested areas may be hidden.

Treatment Options for the Old House Borer

If there is infestation inside the attic or the house (but not in the crawl space) and it is **very limited in scope**, it is recommended that the **infested wood be removed** and replaced with new wood. Wood in the attic may be treated with a Borate product (following the label).

If the infestation is inside the home, it is also recommended that the customer use a dehumidifier inside the infested room/s if a heating/AC unit is not used on a regular basis.

If the infestation is in the attic, it is also recommended that ventilation be increased in the attic (attic fan or other means).

Old House Borer

Obviously, one could not guaranty that the treatment would control the Old House Borer infestation, as some infested areas may be hidden.

Treatment Options for the Old House Borer

If there is **<u>widespread infestation</u>** inside the structure, in the attic, above the subfloor of the crawl space or on the outside of the structure, I recommended that the structure be fumigated with Sulfuryl fluoride in compliance with the label.

Old House Borer

If the infestation is either in the wood inside the structure (1st floor or above) or on the outside of the structure, it is recommend that the structure be fumigated with Sulfuryl fluoride in compliance with the label.

So…that's all folks!

I hope the information that I have provided you has given you a better understanding of wood destroying beetles.