

Wood Destroying Organisms

Most wood destroying beetles live, eat and breed in the timber and they are totally self-sufficient in the timber that they infest until they are ready to mate. This normally occurs when the wood destroying insect makes a flight hole and then escapes from the timber to start the whole life cycle again.

Due to this fact total fumigation of the infested area with a gas insecticide like Methyl bromide is the only effective measure as the gas will penetrate the timber killing the wood destroying insect in all its life stages.

We do have some treatment options:

- Removal of infested timbers and replacing them from joint to joint with new pre-treated timber.
- Application of an appropriately labelled insecticide to the surface of infested wood to kill emerging beetles and prevent re-infestation.

Remember that these remedies will not penetrate the timber sufficiently to kill any wood destroying insects deep in the timber.

Drilling and treatment of infested wood to kill the larvae in their galleries. This treatment is not always effective as it does not always reach all stages of infestation and it has no effect on the eggs.

Total fumigation of the infested structure with a toxic gas that will penetrate the timber and galleries killing all stages of the life cycle of wood destroying insects is the preferred method of treatment.

The Italian Beetle - Old House Borer

(*Hylotrupes bajulus*)



Appearance

This is a true long horn beetle and range in length from 15 – 25mm. This insect infests seasoned timber in buildings and only attacks softwood.

The body is slightly flattened, and the colour is brownish black to black in colour. The prothorax behind the head is rounded in shape and contains two raised, shiny black bumps. Yellowish gray hairs may be present on the head and the prothorax.

Larvae

The head end is much larger than the tail end of the larvae and is round in shape. The larvae can grow from 20-40mm in length.

Frass

The frass of the Italian beetle consists of very fine powder and tiny pellets that are tightly packed within the galleries. The exit or flight holes are oval in shape.



Life Cycle

Male and females mate and eggs are deposited in cracks and between pieces of wood, and upon hatching the larvae bore down into the wood and begin to feed. The galleries run parallel to the wood surface and become filled with tightly packed frass, consisting of fine powder and tiny pellets. As the larvae continue to grow, their feeding activity becomes audible and can be heard when it is quiet.

The Brown House Borer

(*Oxypleurus nodieri*)



The Brown House Borer, *Oxypleurus nodieri* belongs to the insect family Cerambycidae

Appearance

The egg is yellowish-white, cylindrical, about 1.5 mm long and 0.8 mm wide, with rounded ends. The larva is a slender creamy-white grub with the thickened thorax typical of the longicorn beetles. It can grow up to 18 mm long. The orange coloured head is sunk into the thorax, and the dark brown, wedge-shaped mandibles can be clearly seen.

The legs are quite small but comparatively well developed for the long horned beetles, each leg having three segments. The pupa has the antennae, legs and wings of the adult folded down along the front as in most beetles. It is of a creamy-white colour until shortly before emergence, when the eyes, mandibles, wings and legs gradually darken in colour. The beetle is of a uniform gingery brown colour, and up to 14 mm long. The male is usually smaller than the female. The antennae of the male reach to the end of the elytra (wing covers), but those of the female are shorter and they reach only about two thirds of that length.

Life Cycle

Eggs are laid in small groups under the bark of pine timber and in cracks in the wood. The female is especially attracted to timber with high moisture content. The larvae hatch from the eggs and they tunnel into the sapwood where they grow slowly over a period of two to six years, depending on the weather conditions and probably also the starch content of the timber.

During this time the larvae make tunnels by chewing and ingesting the wood, leaving their characteristic frass behind them in the tunnels. The larvae eventually form pupae, also inside the timber, during the autumn, and these emerge as adults within a few weeks thereafter.

The frass produced by the larva is in the form of spirally twisted shavings and threads which are quite characteristic.

Habits and Behaviour

The brown house borer is mainly a forest insect which infests the dying branches and dead stumps of pine trees. From this type of situation in the wild, the species has spread to untreated pine timber used in buildings. Because the flight holes of the emerging adults look like those of the Italian beetle, *Hylotrupes* sp., there has been some confusion in the past as to which species is really causing the damage. In fact, the Italian beetle is much the more serious pest.

The brown house borer is indigenous to (that is, it belongs in) Algeria, Morocco and Tunisia in North Africa, and it were first reported from Cape Town in 1883. Since then it has been noted from the Southern Cape eastwards as far as Port Elizabeth.

Damage

The damage is caused by the burrowing of the larvae, mainly in the sapwood of the timber (which weakens it) and also by the adults, which make oval holes in the surface of the timber when they emerge after pupation.

Under the right conditions and over a long period of years the timber can be reduced almost to a shell at the surface, with sawdust inside, but it is more usual to find the few holes of an early infestation with only a small number of larvae or adults at any one site. It is believed that most infestations arise from the use of freshly untreated pine timber.

Damage caused by the brown house borer seems to be of only minor economic importance.

Furniture Beetles

(*Anobium punctatum*)



Anobium punctatum, the common furniture beetle, which is widely distributed throughout South Africa but causes most damage in the coastal areas. The beetle prefers sapwood but will attack heartwood, and it has been reported to attack both hardwoods and softwoods.

Appearance

When full grown, the creamy-white larva is about 5-7 mm long, with three pairs of legs and a dark coloured head.

The *Anobium* larva usually remains curled up in the shape of a comma when it is removed from its tunnel in the wood, and it does not usually have an enlarged thorax. Both these features help to distinguish it from the larva of the Powder Post beetle.

The beetle can vary in length from 2.5 mm to 5 mm and it is usually reddish or yellowish brown. The wings are well developed and the beetle is capable of sustained flight. A characteristic feature is the series of nine longitudinal rows of small pits on each wing cover which can easily be seen with a binocular microscope.

The head is bent downwards, and when the beetle is viewed from above it is hidden underneath the front edge of the thorax. The last three antennal segments are lengthened slightly, but not clubbed. The pits on the wing covers, the hidden head and the antennae all help to distinguish this beetle from the Powder Post beetle *Lyctus brunneus*.

Life Cycle

The female lays her eggs singly or in small groups in cracks in the wood, in joints, on rough sawn surfaces, or in old emergence holes. The larvae hatch after 3 - 4 weeks and tunnel straight into the wood. A larva can take up to 2 years to become full grown, depending on conditions.

The pupa is formed just below the wood surface and when the adult emerges it pushes some wood dust out in front of it. Mating usually takes place at the emergence holes on the surface or inside the galleries in the wood. One female can lay up to 80 eggs during her lifetime.

Frass

The frass produced by the larvae is quite characteristic, in the shape of microscopic barrels or spindles. The inside excavations and flight holes are filled with this powdery bore dust and when rubbed into the palm of the hand it has a gritty feel resembling salt.

Habits and Behaviour

Since the furniture beetle prefers old, seasoned timber, furniture stores may often contain infested articles. The females emerge, mate and lay their eggs close by so that the infestation spreads rapidly to other articles in the store. The distribution of infested furniture to places previously free of the beetle is probably the commonest method of spreading the pest.

An *Anobium* infestation may continue in the same piece of furniture for a long period, but after the wood has been thoroughly honeycombed, the beetles desert it. Sometimes they leave before the wood is totally destroyed. The emergence holes made by emerging *Anobium* beetles are circular and about 1.5 mm in diameter.

The pest is commonly found in joinery timbers, structural timber and flooring, as well as in furniture, musical instruments made of wood, tool handles and garden implements. A superficial covering of leather or cardboard, or even of thin metal sheeting, does not prevent the beetles from emerging, for they bore through these materials as well.

Damage

The furniture beetle prefers to attack wood that has been seasoned and in use for some years. Timber that has been free of damage for 20 years can suddenly show signs of infestation. It is believed that a slight chemical change in the wood may attract the beetles.

The first indication of infestation is the appearance of emergence holes in the surface of the wood and small piles of sawdust underneath. The holes are made by the adult insects emerging from the wood. The galleries inside the wood, made by the larvae burrowing and feeding are often so numerous that they seriously affect the strength of infested wood.



False Furniture Beetle

(*Nicobium castaneum*)



Nicobium castaneum (also known as the “False Furniture Beetle”), is a very close relative of the furniture beetle, *Anobium punctatum*. This is a slightly larger and more reddish coloured beetle, but *with the same habits*. It is found in coastal situations from Kwa-Zulu Natal, where it is most common, down to the Western Cape.

The main distinguishing feature of this species is that the larvae make noticeable cocoons in which to pupate, and these are found in the tunnels and near the surface of infested wood, where the adults can break out easily later.

The cocoons are oval in shape, about 6 mm long, smooth on the inside, and roughened with frass on the outside. There is a circular cap at one end of the cocoon, where the beetle finally emerges.



The Pine Bark Anobiid

(*Ernobius mollis*)



The Pine Bark Anobiid (*Ernobius mollis*) is a wood boring beetle of secondary importance when compared with its relative, the furniture beetle. It is however of particular importance to seasoned softwood timber and interior woodwork of timber that has not had the bark removed and has not been treated with a preservative.

Appearance

The body of the larva is straight when newly hatched, but it soon becomes curled over in the shape of a comma. The colour is pale creamy-yellow or pinkish with the head darker and the mandibles nearly black. The body is markedly swollen in the thoracic region and slightly swollen in the region of the eighth abdominal segment.

The full grown larva grows to 7 or 8 mm long. There are three pairs of well-developed legs each with five segments. This distinguishes them from the larvae of other bark beetles which do not possess legs. When fully grown, the larvae excavate pupal chambers just below and parallel to the surface of the wood, and they pupate in these. The pupal cells are lined with smooth dark brown material on the inside and covered with frass and wood shavings on the outside.

The pupa shows the antennae, legs and wing buds of the beetle on its ventral surface and while the body colour is pale yellow, the mandibles in marked contrast are black. The adults measure 3.5 - 5 mm. They are reddish brown, with silky yellow hairs which soon wear off.

The head is tucked well down so that it is not visible when the beetle is looked at from above (but the thorax is not hooded to the same extent as in the furniture beetle). The antennae are long and slender. The elytra are soft and smooth, and almost three times the length of the thorax.

Life Cycle

The female beetle seeks out dry softwood with the bark still adhering to it, and she lays her small white eggs under or in crevices in, the bark. She lays only a few eggs at a time and so causes infestations to develop at several different sites.

Experimental work has shown that one female can theoretically lay up to 120 eggs, but in practice the number laid is much smaller. The beetles live for about 1 month and neither sex has been seen to feed during this time. The eggs hatch in 2 - 3 weeks.

When the larvae hatch they bore mainly in the bark, but also through to the cambium layer and in the sapwood. Their tunnels turn and twist at random in the wood and they are loosely packed with frass. The tunnels are 0.5 – 3.5 mm wide and surprisingly short (only 8 - 12 mm long) but severe infestations can seriously affect the wood surface.

The larvae grow for a period of 8 - 9 months before they pupate. The pupal stage only lasts 10 - 14 days and the beetles emerge from the wood after a further resting period of about a week. Their flight holes are circular and about 2 mm in diameter, and small piles of frass accumulate beneath each hole as the beetles emerge.

The complete life cycle from egg to adult normally takes one year, but from eggs laid in the very early spring there may develop a small second generation that gives rise to a few adults in the autumn. The beetles can fly for considerable distances and it is possible therefore for an infestation to spread rapidly over a large area in quite short time.

Habits and Behaviour

In South Africa the beetle was first reported at George in 1937 as breeding in small numbers under strips of bark in timber stacks. By 1939 the pest was found to be present in enormous numbers attacking and breeding both in rough sawn planks and in finished products such as ceiling and flooring boards. At that time it was shown that the beetle had been imported inadvertently from Europe in about 1935 in packing cases (containing mill machinery) with the tree bark surfaces on the inside and out of sight.

Damage

The larvae chew and damage the bark, making tunnels particularly in the part nearest to the sapwood. However the tunnels are found half in the bark and half in the sapwood, so the pest is really a cambium feeder. The larvae also tunnel in the brown pith where this occurs and next to resin canals, and also in the bark around the knots and needle bases in knotty pine slats and strips.

Damage is commonly found in fencing posts, pergolas, summer houses, outbuildings and other rustic timber work where the bark has been left attached.

Powder Post Beetle

(Lyctus brunneus)



Powder Post beetles (Family: Lyctidae) are the most serious of the insect pests of hardwoods, but fortunately they only attack the sapwood.

Appearance

When fully grown the larva is about 5 mm long, creamy-white, with a dark head and strongly arched. The thorax is enlarged and has three pairs of legs.

The beetle is variable in size, but generally about 4 mm long and reddish-brown to black with no special marks or pits on the elytra. The head of the beetle is visible from above, which distinguishes it from the furniture beetle, of which the head is bent downwards and hidden underneath the front edge of the thorax.

The last two antennal segments are enlarged, so that the antennae appear to be clubbed at their ends.

Life Cycle

The eggs are white and about 1 mm long. Usually 2 - 3 eggs are laid in each vessel. The larvae hatch after a week or two, depending upon the temperature, and the larval period is spent inside the timber. The galleries of the small larvae are usually made along the grain of the wood, but those of later stages cut across the grain. If the wood is severely infested, the galleries join and the wood may collapse.

The full grown larva bores to a position just underneath the surface of the wood and makes a cell in which to pupate. At first the pupa is creamy-white but later it becomes darker. When the adult emerges it waits a day or two until its skin hardens and then it bites a short tunnel to the outside of the wood.

Under normal circumstances the life cycle probably takes 1 year to complete. However, where conditions such as temperature, moisture and food are very favourable, it is possible that this may be reduced to less than a year. Where the timber is cold and dry the life cycle may take as long as 5 - 6 years.

Adult *Lyctus* beetles are good fliers and are attracted to light. The frass is in the form of a very light powdery dust, usually light coloured, and resembling face powder.

Habits and Behaviour

Lyctus larvae are unable to digest the cellulose of the wood, but feed on the starches and sugars contained within the cells. For egg laying the female beetles actively seek sapwood containing 3% or more of starch in the xylem parenchyma. The female's ovipositor can be extended to at least the same length as her body in order to deposit eggs in the xylem vessels.

The adult pushes out powdery sawdust from the emergence hole at the time of emergence, and these small piles of sawdust collecting around or just below the emergence holes attract the attention, and they have given the insect its name of "Powder Post beetle".

It is often found that the adult beetle has to penetrate other materials lying on top of or against infested wood, in order to emerge from its pupal cell. Cases have been reported where paper, leather, plaster, asbestos and even sheet metal have been damaged by the emerging beetles.

Mating takes place outside the timber soon after emergence, and egg laying commences within a few days.

Kiaat, wattle and eucalyptus timbers as well as many central African hardwood timbers are very susceptible to attacks by *Lyctus*.

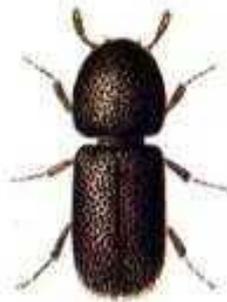
Damage

The damage is caused by the larvae which tunnel through the sapwood without coming to the surface. Since the life cycle may take as long as six years, an infestation may not be noticed when the timber is cut and used. It is only later that the purchaser finds beetles emerging from untreated wood, and notices the small heaps of fine wood dust or powder from which the beetle gets its name. By that time the strength of the wood may be very much reduced, and in the case of a thatched roof supported by gum poles, the whole structure may collapse.

Infestation can take place soon after felling or in the timer yard, but as far as is known the Powder Post beetle does not enter buildings to lay its eggs and does not lay them in polished, painted or treated wood.

The Bamboo Borer

Bostrychidae
(*Dinoderus minutus*)



The bamboo borer, *Dinoderus minutus*, came originally from the Far East, but which is now distributed throughout Natal and along the East coast.

Appearance

The adult beetle is only about 2.5 mm long, and infestations can be found in cane baskets, and furniture, wicker work, bamboo fishing rods, etc. These beetles

can vary in size from 3 to 25 mm long, depending on the species, and they are characterised by having a roughened, hood-shaped thorax which projects over the head so that the head cannot be seen when viewed from above. They are mostly reddish-brown to dark brown in colour.

Most of the adult beetles have spines or protuberances on the front edge of the thorax (the pronotum) and on the hind end of the wing covers (the elytra). Their bodies are cylindrical in shape and they fit their galleries very closely, so that when they die, the galleries become blocked by the dead bodies, particularly just at the flight holes. The larva is whitish or cream-coloured, with a swollen fore-part, and shaped like a comma. The head is usually sunken into the thorax, and there are three pairs of rather poorly developed legs.

Life Cycle

The adult female lays her eggs in cracks in the wood and bark, and in the case of sawn timber, on the rough surfaces and cut ends. In some species, the male and female adult beetles co-operate to make an entrance hole and a gallery, and then the eggs are laid at the far end of this, right inside the timber. The gallery made by the adult beetles is usually bored into the timber at right angles to the surface, and after a short distance in turns to run parallel with the surface. It is usually kept clean and empty of sawdust, but the dead bodies of adults often block the entrance completely.

The eggs hatch and the young larvae burrow into the timber by eating and chewing the wood. They thrive on the starch, sugars and proteins contained within the wood cells. They fill their galleries with frass (excreta and sawdust) packed tightly behind them. The galleries are circular in cross section, and not flattened like those of the long horned beetles. As the larvae grow, so the galleries become larger, until after many months the larvae gradually work their way to just beneath the surface of the timber where they form cells in which to pupate. The pupa is the resting stage in the life cycle, and this may last for several weeks, before the adult beetle emerges.

There is usually one generation of the beetles in each season; but there are exceptions to this rule where in some species two or even three generations are raised under warm conditions in a single season. Cold conditions and a poor food supply can also lead to a single generation taking longer than one year.



Habits and Behaviour

Damage to hardwood timber takes place mostly at the time of timber extraction from the forest, so that the initial infestations can often be found in timber yards and mills. These beetles will attack seasoning timber while it is still at much higher moisture content than is suitable for the powder post beetle, *Lyctus* sp.

The larvae continue to develop in the timber as it dries out and they can still be found active in seasoned timber. After emergence, however, the adults will not normally re-enter fully seasoned timber.

The shot-hole borers can be of some importance in hardwood timber in this country, but they are not generally such serious pests as either the Italian beetle (in softwood), or the furniture beetle.

Damage

Tunnels are made in the sapwood of hardwood timber by the larvae: and when the adult beetles emerge later, the flight holes of 1 - 3 mm diameter which appear on the surface can be quite numerous. The quality and strength of the timber can be seriously reduced.

The shot-hole borers are, however, very widely distributed, and although they normally infest only cut timber, the adults sometimes bore and feed inside the thin stems and branches of living trees which are then weakened and easily broken by the wind.

Attacks on living trees by the adults can occur as a result of heavily infested dead wood lying in the vicinity. This type of attack by the adult beetles is mainly of local occurrence only, and if the adults lay eggs in healthy trees, the subsequent larval development is often suppressed or stopped altogether by as strong flow of sap and gum exudation.

Bark Beetles

(Scolytidae)



The bark beetles excavate wide-spreading galleries immediately underneath the bark of stressed (unhealthy) and dying trees.

Appearance

The beetles themselves are small (2- 5 mm long) and the tunnels of 1 - 2 mm across are made both by the adults and the larvae. The body is elongated-cylindrical brown in colour sometimes reddish brown or black. The head is normally concealed from above. Antenna is short, elbowed and usually clubbed. Certain patterns of tunnels are characteristic of particular types of beetles within the family.

Damage

The beetles may cause problems in rough-hewn wood where the bark is left intact on the surface, such as is used for summer houses and bark shelters. These beetles do not infest dried wood or bark again, and they cause little loss of strength to the wood from which they have emerged. Piles of frass are seen below and around the outside entrance holes which go through the bark.

If the bark is removed, the tunnels and galleries leave scoring on the surface of both the sapwood and inner bark as this is the area in the timber that they infest, normally stripping the bark from the timber. Sometimes they can survive for a year in the timber after it has been felled.



Control

All that is needed is to strip the bark from the timber as you are now removing the food source the bark beetle will die off.



Ambrosia Beetle

Wood stainers



The common name comes from their use of ambrosial fungus as food and this fungus stains the wood. Adults bore into the wood of live or recently felled trees to create tunnels and chambers to raise this fungus thus making it a forest insect.

Appearance

Adults are 2-8mm long; body is very elongated, with colour light to dark brown. Head is visible from above and as wide as or wider than the pronotum. Antennae are weakly elbowed and clubbed.

Eggs are laid in the tunnels and the larvae feed on the threadlike fungal hyphae. The mature larvae are 4-12mm long, legless and the body is cylindrical. Pupation occurs within these tunnels and adults emerge through the original entrance hole. There is usually 1-2 generations per year.

Damage

The adult beetle bores several centimetres into the wood across the grain into the sapwood and heartwood but do not eat the wood and the tunnels are free from frass. The tunnel walls are inoculated with ambrosia fungal spores. The primary damage is from the dark blue, brown or black stain which results from the fungus grown as their food source. Signs of infestation might include the beetles themselves or piles of shavings/frass around entrance holes ranging from 0.5-3mm in diameter. The frass is often curled as if cut from the wood by a wood carving chisel.



Control

No control measures are necessary as ambrosia beetle only attack and infest trees in forests or newly felled trees with very high moisture content. When timber goes through the drying process in kilns the infestation is normally killed. In log homes treatment may be required using a registered wood preservative.

Pin-Hole Borers

(*Platypodinae*)



There are many species of beetles in the sub-family Platypodinae. They make small, straight, galleries like pin-holes in fresh timber

Appearance

The adult beetles are quite small (from 2 to 6 mm long, but mostly about 3 mm long). They are reddish brown to nearly black in colour, and usually cylindrical in shape with pronounced clubs at the ends of their antennae. The full-grown larvae are soft-skinned and nearly straight in form.

They have no legs, and move by alternate contraction and expansion of segments along their bodies (in comparison, the larvae of the powder post beetle each have six legs, and their bodies are curled over into the shape of a comma).

Life Cycle

The arrangement of tunnels bored by the adults varies greatly with the different species. Some species construct simple galleries in which the eggs, larvae, pupae and adults are all found living together; others construct compound tunnels with numerous branches, along the sides of which are niches known as "cradles".

Eggs are deposited in these cradles, and the larvae and pupae develop there, with the adult beetles inserting plugs of the ambrosia fungus as food at the cradle entrances.

The life cycle from the time of boring in by a pair until the offspring begin to swarm may be from 5 weeks in some species up to six months or a year in others. The period of occupation of a log by colonies of pin-hole borers is determined by the rate of seasoning or desiccation.

When the moisture content has fallen to about 40%, the wood is vacated by the beetles. The total emergence period of the occupation may last for six months, and all broods escape through the original entrance tunnel of their parents, or that of an adjacent colony, if they have joined up. New exit tunnels are not made.

Habits and Behaviour:

Damage to hardwood timber takes place almost immediately after felling, and at the time of timber extraction, and the damage is thus often found in timber yards and mills.

These beetles will attack timber while it is still drying and still at a higher moisture content than is suitable for the development of the powder post beetle, *Lyctus* sp.

Damage

The adult beetles select dying or felled trees, saw logs, green timber, or other un-seasoned or moist wood such as stave bolts, or wine casks. Small round tunnels (pin-holes) are bored directly into the sapwood or heartwood, and since the beetles do not feed on the wood, the borings are cast out of the tunnels and they collect on the surface of the bark or wood as a fine light-coloured powder.

While a few of these beetles bore into standing living trees, the greatest damage is done to newly felled poles, logs and branches which are attacked within a few hours of felling, and these remain under attack as long as they remain moist enough.



The pin-hole borers are especially abundant in tropical and sub-tropical situations and they are serious pests

of timber in all the central African states. Imported African hardwoods frequently show pin-hole borer damage, which can at times be confused with that caused by the powder post beetle. Hardwoods are most frequently attacked, and softwoods only rarely, but both sapwood and heartwood can be damaged. Very many timbers are susceptible to attack.

Carpenter Bees

(*Xylocopinae*)



The carpenter bees (Family: Anthophoridae; sub-family: Xylocopinae) are very well known in this country because they are the largest of the bees (about 18 mm long), and they make their nests in dry wood such as split pole fences or the roofing poles of buildings. The nest is a large round hole, about 10 mm in diameter, such as might be made by a carpenter's drill.

The female partitions the hole into six or seven cells with walls of sawdust between them, and in each she puts a mixture of nectar and pollen. She lays her egg upon this. There is only one generation a year, and most of the life of the bee is spent as an adult.



In the genus *Xylocopa*, the female bee of one species is a dark shiny blue-black colour all over, while the male is a yellowish brown. A rotten tree trunk can provide a noisy buzzing nesting colony from where females can fly out to excavate new nests in the end grain of fascia boards and rafters on buildings in the neighbourhood.

The carpenter bees are not of very great importance, economically speaking, in timber.