Polyphagous Shot-Hole Borer (PSHB) in Western Australia

Polyphagous shot-hole borer (*Euwallacea fornicatus*) is a tiny ambrosia beetle, about 2 mm long, that tunnels into the trunks and branches of a very wide range of trees. It was first found in Perth in 2021. The beetle carries symbiotic fungi that it farms inside its tunnels. In Western Australia two fungi are associated with PSHB; *Fusarium* sp. (AF-18), and Graphium euwallaceae. The fungus blocks the tree's conductive tissue, which causes branch dieback and, in reproductive hosts, can kill the tree.

The response is in a transition to management period, which ends on 31 December 2026. After that date WA enters the management phase. What the management phase will involve has not yet been announced. The Perth metropolitan area is a Quarantine Area, and there are rules on moving wood, green waste and plant material. Use the DPIRD Quarantine Area map to check which zone a property is in and what rules apply before any tree work is planned.

Think you've found PSHB? Report it.

- **MyPestGuide® Reporter** app (photos and location)
- **DPIRD Pest and Disease Information Service (PaDIS):** (08) 9368 3080 or padis@dpird.wa.gov.au

Put a ballpoint pen next to the holes in your photos to show their size. Do not cut, move or dispose of suspect material until you know the Quarantine Area requirements.

What to look for

Damage often starts in the lower trunk and main branch unions. Early signs are easy to miss, so check susceptible trees closely and regularly.

- **Entry holes about 1 mm across** (the size of a ballpoint pen tip), often in clusters.

- **Gumming and staining:** dark, wet-looking exudate or resin running down the bark from the holes.
- **"Sugar volcanoes":** white, crystalline or foamy sugary deposits around entry holes, common on some species.
- **Frass:** fine, sawdust-like material or compacted "noodles" pushed out of the holes.
- **Galleries and staining in the wood:** when cut, the wood shows thin tunnels surrounded by brown-black fungal staining.
- **Dieback:** wilting, yellowing or dead leaves and branch failure in the canopy.



Gumming on a Casuarina limb. Dark exudate runs down the bark from PSHB entry holes.



Dissected wood. Beetle galleries with the dark staining caused by the associated fungi.



Adult PSHB under a field microscope. Adults are dark brown to black and about 2 mm long. Positive identification needs a microscope and, ideally, laboratory confirmation.

Host species

PSHB has been recorded attacking more than 500 plant species worldwide. What matters most is whether a tree is a **reproductive host**: one where the fungus establishes and the beetle can breed. Reproductive hosts produce large beetle populations and are usually the most damaged. In non-reproductive hosts the beetle may bore in but cannot breed as the fungus cannot establish in the tree.

Reproductive hosts in Perth

Reproductive hosts recorded in Perth include:

- Box elder (*Acer negundo*) and other maples
- Moreton Bay fig (*Ficus macrophylla*) and other figs

- Coral trees (*Erythrina* spp.)
- Plane trees (*Platanus* spp.)
- Castor oil plant (*Ricinus communis*)
- Robinia, willows, poplars, liquidambar and avocado
- *Casuarina* / she-oaks and several other Australian natives

DPIRD keeps a **WA affected plants list** ranked by susceptibility and a **tree species exclusion list** of species that should not be planted in the Quarantine Area. Always check the current DPIRD lists: host records are still being updated as the response continues.

Monitoring: traps and lures

Trapping helps confirm whether PSHB is active on a site, shows when beetles are flying, and helps target inspections and treatment. Traps support visual inspections of trees but cannot replace them.

Trap types

- **Funnel traps** (for example multi-funnel or Lindgren-style) with a collection cup. They catch large numbers of beetles and keep specimens in better condition for identification.
- **Sticky traps** (panels or sleeves coated with non-drying adhesive). They are cheap, light and easy to deploy across many sites, and beetles can be counted in place.

Lures

- The standard PSHB attractant is **quercivorol**. It is sometimes paired with an enhancer such as alpha-copaene.
- Lures lose strength over time. Replace them at the interval the manufacturer recommends and record the date each lure was put out.
- Place traps in the vicinity of host species, not directly next to them, at about 1–2 m above ground. Check them on a regular schedule (for example every fortnight) and record catch counts for each trap.

Other small beetles are also attracted to traps. Suspect specimens should be identified by someone trained to do so and confirmed by a laboratory. Detections must be reported to DPIRD.



Sticky trap with lure. The lure draws beetles in and the adhesive surface holds them for counting and identification.



Sticky trap in the field. Traps should be checked, recorded and serviced on a regular schedule.

Treatment and management options

No single treatment eliminates PSHB from a tree. Management combines several measures chosen for the tree's value, its host status, how heavily it is infested and the risk it poses to nearby trees. Chemical options are still being trialled in WA, and DPIRD notes that the fungus can limit how well systemic products move through the tree.

An integrated approach

PSHB is best managed with an **integrated pest management (IPM)** approach. This means combining monitoring and inspection, tree health care, hygiene, targeted pruning or removal, correct disposal, chemical treatment where it is justified and permitted, and replanting with suitable species. No single measure is relied on. Decisions are based on monitoring data and on each tree's value, host status and level of infestation, and results are reviewed over time so the program can be adjusted.

Option	What it involves	When it is used
Removal and disposal	Felling heavily infested trees, then chipping, solarising (sealing under plastic in the sun) or taking the material to an approved green waste facility, following Quarantine Area rules.	Heavily infested reproductive hosts that act as beetle "factories" or have become unsafe.

Option	What it involves	When it is used
Targeted pruning	Removing infested limbs back to sound wood, then handling the prunings the same way as removed trees.	Infestation limited to a few branches on an otherwise valuable, retainable tree.
Systemic trunk injection	Injecting insecticide (for example emamectin benzoate) and/or fungicide into the vascular system.	High-value trees in early to moderate infestation. Must be used only under a current APVMA registration or permit.
Bark sprays and paint-on applications	Applying insecticide, sometimes with a fungicide or penetrant, to the bark where beetles are boring in.	Preventive or supplementary treatment on high-risk trees. Must be used only under a current APVMA registration or permit.
Tree health care	Watering, mulching (with clean, non-host mulch) and reducing stress from construction or soil compaction.	All retained trees. Stressed trees are more easily colonised.
Hygiene	Cleaning saws, pruning tools, chippers and vehicles (for example with 70% ethanol) before moving between trees and sites.	All PSHB work, every time.
Replacement planting	Replanting with species that are not on the DPIRD exclusion list and have low susceptibility.	After removals, and in new streetscape and park planting.

Chemical use: APVMA requirements

Any chemical used against PSHB must be applied under a **current APVMA product registration or APVMA permit** that covers the product, the pest, the situation and the application method. **All operators must provide proof, including a copy of the APVMA permit or label they are working under.** Check that the permit is current on the APVMA permit search before work begins.

Engaging a PSHB contractor: guide for local governments

PSHB work affects biosecurity, pesticide law and tree risk all at once. When local governments, land managers and property owners engage a contractor to treat PSHB or give advice about it, ArbWest recommends checking for the following as a minimum.

Recommended minimum requirements

- ☐ **Qualifications:** Diploma of Arboriculture (AQF Level 5) or higher.
- ☐ **Pest management licence:** a current WA pest management licence that covers the work being done, with a copy provided.
- ☐ **Authority to move samples (permit to move):** authorisation to collect suspect PSHB material and transport it to a biosecurity diagnostic laboratory such as Xytovet.
- ☐ **APVMA permit or registration:** a copy of the current APVMA permit or product label the operator will be working under, provided before any chemical treatment.
- ☐ **Proven PSHB experience** (preferred): evidence of past PSHB surveillance, trapping, sampling or treatment work, such as project references or reports.

Also worth asking for

- Current public liability and professional indemnity insurance.
- A written hygiene protocol for tools, machinery and vehicles.
- A plan for handling and disposing of infested material that meets current Quarantine Area requirements.
- A monitoring and reporting plan covering trap placement, service intervals, record keeping and how detections will be reported to DPIRD.
- Clear reporting back to the client, including tree locations, photos, host status, severity rating and recommendations.

Please note: These are **recommendations only**, offered as a guide to help organisations engage a suitably qualified professional. They do not replace legal obligations or requirements set by DPIRD, the APVMA, WA Health or any other authority. Always check current requirements with the relevant agency.

More information

DPIRD: Polyphagous shot-hole borer

APVMA: Search for a permit

Information current at the time of publication. The PSHB response is changing, so check DPIRD for the latest advice.

Photos: Dave Crispin