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Australian Garden History

A portfolio of trees
The Dale Panorama
A whalebone arch

AGHS – promoting awareness and conservation of significant gardens and cultural landscapes

Advocacy

Beetle alert – ruiner of trees: polyphagous shothole borer

How could a tiny beetle, the polyphagous shothole borer (PSHB) (*Euwallacea fornicatus*), only the size of a sesame seed utterly change our cities, and even our food supply? With relative ease, apparently. Coastal areas around the country have a climate that particularly suits the beetle. We all need to be vigilant.

In Perth, large trees infested by the borer have been cut down in prominent historic places such as Kings Park, Hyde Park and around Lake Claremont. Perhaps the most distressing sight has been the felling of many giant Moreton Bay fig trees (*Ficus macrophylla*) along Mounts Bay Road under Kings Park. This was witnessed by thousands of local people and tourists as they drove past. Stumps are gradually being removed. No doubt Kings Park and Botanic Garden has a plan to replace these giants, but in the meantime the bare ground is a harsh sight.

ABOVE Mounts Bay Road, Perth, with remains of Moreton Bay figs (*Ficus macrophylla*) and remnant Mediterranean garden, May 2025, photo Caroline Grant

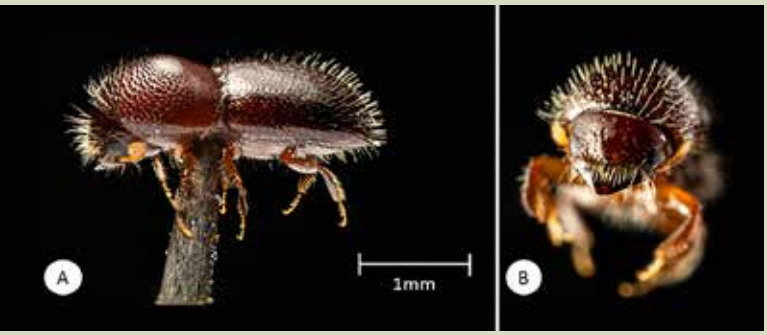
Polyphagous shothole borer

Such an unobtrusive arrival! In 2021, an observant gardener in Fremantle noticed that her box elder maples (*Acer negundo*) were ailing. She found tiny holes and tunnels in the trunks and used the 'My PestGuide Reporter' app on her phone to check the possible cause. Experts arrived and found that the tiny culprit was what they called the ambrosia beetle or *Euwallacea fornicatus*.

Originating in Southeast Asia, the beetle is also known as tea shot-hole borer (because it has long been a pest to tea plants, especially in Sri Lanka

and India) or the polyphagous shot-hole borer: 'poly' from the Greek for many, 'phagous' from the Greek 'phagus', meaning that eats or feeds on, and shot-hole for the tiny holes made by the beetle, as if caused by shot from a shotgun.

Its partner in crime is a *Fusarium* fungus, referred to as a symbiont because of the two organisms' close relationship: the beetles excavate tunnels or galleries in the trunks and branches of trees. They introduce the fungus into these tunnels and cultivate it as a food source. Once inside the galleries, the fungus disrupts the plant's vascular system and its flow of water and nutrients. These galleries also reduce the structural integrity of branches. In susceptible trees, this can cause limb damage and death.



TOP Polyphagous shot-hole borer (*Euwallacea fornicatus*): **A**: adult female 1.8 mm to 2.6 mm long and **B**. a frontal view showing the mycangia (fungal pocket) just above the mouthparts, Source, Botanical Garden Route South Africa

BOTTOM *Fusarium* staining on a dissected limb, photo Dave Crispin

OPPOSITE Signs of attack vary with tree species. In addition to dieback of upper branches, they include pen-tip size borer holes in the trunk or branches; frass, a fine powdery refuse produced by the boring insects; gumming caused by excessive sap being pushed out of the shot holes; staining of the outer bark; sugar volcanoes caused by the tree's response to the disruption of the vascular system. Images, WA Department of Primary Industry and Rural Development

Because the box elder maple is especially vulnerable, the Western Australian Department of Primary Industries and Regional Development (DPIRD) is asking people who have the tree on their property or who identify one in any public area to report their location so these can be inspected. Other favourite hosts among popular Perth trees include robinia (*Robinia pseudoacacia*), coral tree (*Erythrina* x *sykesii*), poinciana (*Delonix regia*), many fig species including edible figs (*Ficus carica*), Moreton Bay figs already described (*Ficus macrophylla*) and Port Jackson fig (*Ficus rubiginosa*). Plane trees (*Platanus* sp.), Chinese hibiscus (*Hibiscus rosa-sinensis*), mulberry (*Morus alba*), plane trees and wisteria are in the high-risk category.

Furthermore, according to DPIRD, native Australian trees are not immune. Among commonly planted eucalyptus species, sugar gum (*Eucalyptus cladocalyx*), South Australian bluegum (*E. leucoxylon*), swamp mahogany (*E. robusta*) and Tasmanian bluegum (*E. globulus*) are on the DPIRD list. The widely planted sea hibiscus or cottonwood (*Talipariti tiliaceum* syn. *Hibiscus tiliaceus*) and the Illawarra flame tree (*Brachychiton acerifolius*) are also in the high-risk category. Western Australia's swamp paperbark (*Melaleuca rhaphiophylla*), common around Perth's many wetlands, is sadly very susceptible. Given that most of the trees affected have smooth bark, it is interesting and disturbing that a paperbark is at risk.

The borer poses a great danger to our horticultural industries. Avocado orchards overseas have proven to be very susceptible, but so are citrus, grapes and olives. Gardeners in Perth who had mature avocado trees producing long-awaited fruit are devastated because their trees have been removed. The shot-hole borer is comparable to the cane toad, but more pernicious because it is much less visible.

According to the Atlas of Living Australia, *Euwallacea fornicatus* is a species complex. This means, from a lay perspective, that this type of beetle may include more than one species, which has implications for its host preferences and economic impact. The beetle's range is around 400 metres, but it can be transported via infected wood.

Controlling the pest

The polyphagous shot-hole borer has spread to many countries and become a pest in California, Argentina, Israel and South Africa. The DPIRD consulted experts in those countries, especially about how to limit its spread. They were given a very grim outlook that forecast enormous costs being incurred by the presence of the borer.

Identifying the culprit is one thing; mustering the resources to search, identify and record its location and habits in its new environment is another. And then we must learn how to control or eradicate it. Western Australia decided to remove many large trees. Unfortunately, the borer has continued to spread and the list of susceptible trees in Perth has grown. Today there is a quarantine area covering much of the Perth metropolitan area. A biosecurity alert was issued by the DPIRD, which has put in place movement controls on bark, potted plants, cuttings, tree prunings, logs, firewood, mulch, timber, wood and wood chips to try to halt its spread.

This 'slaughter the patient' approach, also adopted in California, is now giving way to a different method of control. This is necessary because Perth has already lost much of its tree canopy in recent years, making it vulnerable to the Urban Heat Island Effect and removing trees is very expensive. Urban forest managers realised they needed to do a more thorough investigation of the beetle and its behaviour.

A recent trial has given hope: arboriculturists working together across Perth have used a combination of an insecticide and two fungicides in a capsule that is injected into the trunk of an infected tree. Within two weeks, they have found dead beetles on top of limbs and in dissected trees. In some cases the beetle activity has declined or appears to have stopped. It is still early days, but vigilant efforts to examine and detect borers, document activity and locate affected plants on a shared database may help stop the spread. The best protection is a wider awareness and careful, regular observation.

Caroline Grant AGHS WA, with thanks to the experts advice provided by Dave Crispin (consulting arboriculturist), Chelsea Payne (arboriculturist, Kings Park and Botanic Garden) and John Viska (AGHS WA, who insisted on a more scientific approach to dealing with the borer).

If you observe polyphagous shothole borer (PSHB) activity in your trees, you should inform the relevant authority.

- You can consult the WA DPIRD website (https://www.agric.wa.gov.au/borer), which has also created a reporting app, MyPest Guide Reporter (https://www.agric.wa.gov.au/apps/mypestguide-reporter).
- The federal government has a website: https://www.outbreak.gov.au/current-outbreaks/polyphagous-shot-hole-borer#toc_2 and there is an Exotic Plant Pest Hotline: 1800 084 881
- See also: https://www.agriculture.gov.au/abares