



## Planting to help support eradication of PSHB

The polyphagous shot-hole borer (*Euwallacea fornicatus*; PSHB) was detected in the Perth Metro area in August 2021. The beetle is native to Southeast Asia and attacks a wide range of trees and woody shrubs across urban, agricultural and natural landscapes.

DPIRD are leading an eradication response to PSHB. As no effective chemical treatment exists for control, the best treatment is the removal of infested trees and tree branches.

If you have been impacted by PSHB or are interested in planting trees that are less likely to be attacked by the beetle, it is important to avoid some tree species. Not all species are impacted equally, and by selecting suitable tree species for your property, you can enhance their ability to thrive in the local soils and environmental conditions.

### About PSHB

PSHB attacks a wide range of trees by tunnelling into trunks, stems and branches and planting its symbiotic *Fusarium* fungus, cultivating it inside the tree as a food source for the beetle and its larvae. In susceptible trees, the fungus kills vascular tissue, causing Fusarium dieback and tree death.

**Reproductive hosts** are susceptible trees in which both the beetle and the fungus establish galleries and reproduce.

**Non-reproductive hosts** are attacked by the beetle, but they are unable to establish galleries and complete their lifecycle. In these hosts the fungus does not establish and trees are not expected to die.

You can learn more about PSHB hosts in the following fact sheets – [PSHB - Global host list](#) and [PSHB – Australian host list](#).

### Choosing a tree

The choice of what tree and where to plant it should include factors such as:

- Environmental conditions – planting something suited to the climate, soils and rainfall in your area encourages healthy growth and increases a tree's capacity to defend itself against threats such as PSHB.
- Where in the landscape you intend to plant the trees – biological threats (e.g. *Phytophthora*) or amenity impacts such as powerlines, roads or pathways can cause trees to struggle and reduce their capacity to defend against PSHB attack.
- Planting native species local to your area – as they have adapted over thousands of years to the climate and rainfall, provide food and habitat for native birds, insects and frogs, use less water, need less fertilizer, are more resilient to local diseases and insects, and perpetuate the local species.

# Planting to avoid PSHB attack

**Avoid known hosts** – Care should be taken when selecting species to avoid known hosts of PSHB. Many deciduous trees that lose their leaves in winter appear to be particularly susceptible to PSHB, this includes maples, poplars, plane trees and liquidambar.

## Highly susceptible reproductive hosts

PSHB is likely to cause tree death in these species.



**Box elder maple** (*Acer negundo*) are highly susceptible reproductive hosts that typically die within two years of PSHB attack. They amplify the PSHB population and increase the risk to surrounding trees.

Plants that are highly susceptible to PSHB attack in Western Australia include:

Scientific name <sup>a</sup>	Common name <sup>b</sup>
<i>Acer negundo</i>	Box elder maple
<i>Robinia pseudoacacia</i>	Robinia, mop top robinia, black locust

## Preferred reproductive hosts

Preferred reproductive hosts are host trees that have been recorded as reproductive on at least three properties and are typically associated with moderate to heavy infestation levels.

Preferred hosts in Western Australia include all highly susceptible reproductive hosts identified above, as well as:

Scientific name <sup>a</sup>	Common name <sup>b</sup>
<i>Coprosma repens</i>	Mirror bush
<i>Delonix regia</i>	Poinciana
<i>Erythrina x sykesii</i>	Coral tree
<i>Ficus macrophylla</i> *	Moreton Bay fig
<i>Ficus rubiginosa</i> *	Port Jackson fig
<i>Morus alba</i>	White mulberry
<i>Morus nigra</i>	Black mulberry
<i>Platanus x acerifolia</i>	London plane tree

## Susceptible reproductive hosts

PSHB typically causes branch dieback and/or the beetle may colonise stressed or weakened trees of these species. Susceptible reproductive hosts may be reproductive opportunistically when near a highly susceptible tree or when no other preferred susceptible host trees are nearby.

In Western Australia these hosts include:

Scientific name <sup>a</sup>	Common name <sup>b</sup>
<i>Acer buergerianum</i>	Trident maple
<i>Bauhinia</i> spp.	Orchid tree
<i>Coprosma repens</i>	Mirror bush
<i>Erythrina caffra</i>	African coral tree
<i>Ficus benjamina</i>	Weeping fig
<i>Ficus carica</i>	Common fig (edible)
<i>Ficus elastica</i>	Rubber tree
<i>Fraxinus angustifolia</i>	Narrow-leaf ash
<i>Persea americana</i>	Avocado
<i>Platanus occidentalis</i>	American sycamore
<i>Populus nigra</i>	Black poplar
<i>Pyrus calleryana</i>	Callery pear
<i>Quercus robur</i>	English oak
<i>Quercus suber</i>	Cork oak
<i>Rhaphiolepis loquata</i> (syn. <i>Eriobotrya japonica</i> )	Loquat
<i>Ricinocarpus</i> spp.*	Wedding bush
<i>Salix</i> spp.	Willow
<i>Ulmus</i> spp.	Elm
<i>Wisteria</i> spp.	Wisteria

In Western Australia, the following plants found with PSHB had compromised health or growing conditions that may have contributed to their susceptibility:

Scientific name <sup>a</sup>	Common name <sup>b</sup>
<i>Citrus x latifolia</i>	Tahitian lime
<i>Citrus x aurantium</i>	Bitter orange, Seville orange
<i>Corymbia ficifolia</i> **	Red flowering gum
<i>Mangifera indica</i>	Mango
<i>Schefflera actinophylla</i> *	Australian umbrella tree

The [PSHB – Australian host list](#) factsheet lists all known reproductive hosts in Western Australia, including many that have only been observed as hosts on single occasions or single sites.

## Non-reproductive hosts

Host trees that are attacked but the beetles do not establish breeding galleries. The fungus may or may not cause disease. Trees are generally not expected to die.

The [PSHB – Australian host list](#) factsheet lists known non-reproductive hosts in Western Australia.

## Not-attacked species

Trees that are recorded as not being attacked when growing near highly infested host trees.

This list is derived from those listed as not attacked by PSHB by Mendel et al. (2021), excluding any species or genus listed as hosts of PSHB (see [Australian](#) and [Global host lists](#)).

Scientific name <sup>a</sup>	Common name <sup>b</sup>
<i>Acokanthera oppositifolia</i>	Bushman's-poison
<i>Agonis flexuosa</i> **	WA peppermint tree
<i>Aloidendron barberae</i> (syn. <i>Aloe banskii</i> )	Tree aloe
<i>Aloidendron dichotomum</i>	Quiver tree
<i>Angophora costata</i> *	Sydney red gum, smooth-barked apple
<i>Asemeia apopetala</i> (syn. <i>Polygala apopetala</i> )	Brandegge milkwort, rama mora
<i>Beaucarnea recurvata</i>	Ponytail palm
<i>Callitris columellaris</i> (syn. <i>Callitris huegelii</i> )**	Bribie Island pine
<i>Calocedrus decurrens</i>	Incense cedar
<i>Carpinus caroliniana</i>	American hornbeam
<i>Casimiroa edulis</i>	White sapote
<i>Cercidiphyllum japonicum</i>	Katsura
<i>Chamaerops humilis</i>	European fan palm
<i>Chitalpa tashkentensis</i>	Chitalpa
<i>Chucrasia tabularis</i>	White cedar
<i>Clethra macrophylla</i>	
<i>Corynocarpus laevigata</i>	New Zealand laurel
<i>Cryptocarya rubra</i>	
<i>Cupressus arizonica</i>	Arizona cypress
<i>Cupressus guadalupensis</i>	Guadalupe cypress
<i>Cupressus sempervirens</i>	Mediterranean cypress
<i>Eremophila bignoniiflora</i> **	Gooramurra
<i>Erica x darlyensis</i> (hybrid <i>E. carnea</i> x <i>E. Erigena</i> )	Darley Dale heath
<i>Euonymus hamiltonianus</i>	Hamilton's spindle tree
<i>Feijoa sellowiana</i>	Feijoa
<i>Fouquieria macdougallii</i>	Mexican tree ocotillo
<i>Garrya wrightii</i>	Wright's silktassel
<i>Ginkgo biloba</i>	Ginkgo

Scientific name <sup>a</sup>	Common name <sup>b</sup>
<i>Gordonia axillaris</i>	Fried egg plant
<i>Hernandia bivalvis</i> *	Cudgerie
<i>Itea yunnanensis</i>	
<i>Lagerstroemia indica</i>	Crepe-myrtle
<i>Lagerstroemia subcostata</i>	Chinese crepe-myrtle
<i>Laurus nobilis</i>	Bay laurel
<i>Lippia umbellata</i> (syn. <i>Lippia torresii</i> )	
<i>Lophostemon confertus</i> *	Queensland box
<i>Lycianthus rantonnetii</i>	Blue potato bush
<i>Maytenus boaria</i>	Mayten tree
<i>Melicope elleryana</i>	Pink euodia
<i>Metrosideros excelsa</i>	New Zealand Christmas tree
<i>Myoporum laetum</i>	Mousehole tree
<i>Nerium oleander</i>	Oleander
<i>Nageia nagi</i> (syn. <i>Podocarpus nagi</i> )	Asian bayberry
<i>Nyssa sylvatica</i>	Black gum
<i>Olmediella betschlerana</i>	Guatemalan holly
<i>Ostrya carpinifolia</i>	European hop-hornbeam
<i>Ostrya virginiana</i>	American hop-hornbeam
<i>Pereskia grandiflora</i> (syn. <i>Rhodocactus grandifolius</i> )	Rose cactus
<i>Phoenix canariensis</i>	Canary Island date palm
<i>Phoenix dactylifera</i>	Date palm
<i>Phoenix reclinata</i>	Wild date palm
<i>Phyllostachys aurea</i>	Fishpole bamboo
<i>Pleiogynium timoriense</i>	Burdekin plum
<i>Punica granatum</i>	Pomegranate
<i>Quillaja saponaria</i>	Soapbark
<i>Rhus copallina</i>	Shining sumac
<i>Sciadopitys verticillata</i>	Japanese umbrella pine
<i>Sequoia sempervirens</i>	California redwood
<i>Stenocarpus sinuatus</i>	Firewheel tree
<i>Syagrus romanzoffiana</i>	Queen palm
<i>Tamarix ramosissima</i>	Saltcedar
<i>Tetradium daniellii</i> (syn. <i>Evodia danielli</i> )	Korean evodia
<i>Trachycarpus fortunei</i>	Chinese windmill palm
<i>Weigela coraeensis</i>	Japanese weigela

## Table key

<sup>a</sup> Synonyms are identified in brackets, with the prefix “syn.”

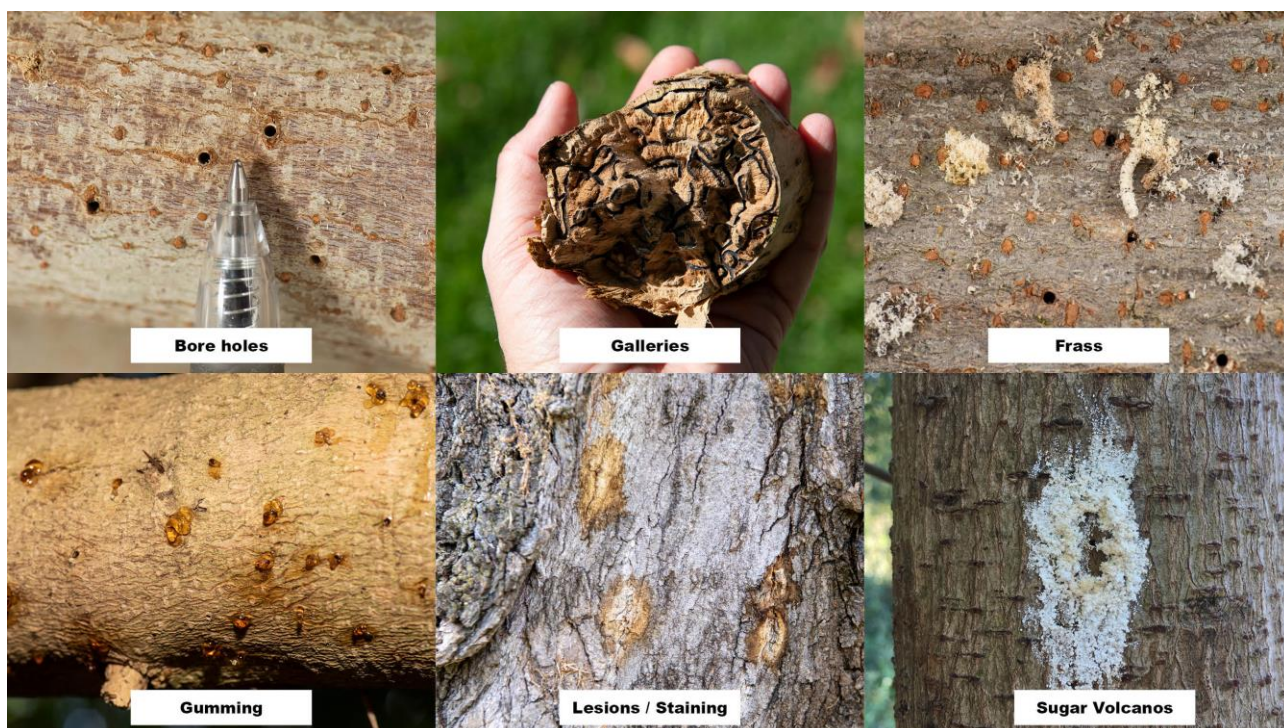
<sup>b</sup> Common names are primarily in an Australian context. Blank spaces indicate that no common name is known for the species.

\* Australian native

\*\* Western Australian native

## Report suspect PSHB damage

Suspect plant pest or disease damage can be reported to DPIRD via the [MyPestGuide® Reporter app](#) or by contacting the Pest and Disease Information Service on 9368 3080 or email [padis@dpiird.wa.gov.au](mailto:padis@dpiird.wa.gov.au).



## References

Mendel Z, Lynch SC, Eskalen A, Protasov A, Maymon M & Freeman S 2021, What determines host range and reproductive performance of an invasive ambrosia beetle *Euwallacea fornicatus*; Lessons from Israel and California. *Frontiers in Forests and Global Change*, 4:Article 654702.

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