

**SANBI Team Member:** tbc

**Main University Supervisor:** Prof Wilhelm de Beer

**Location:** University of Pretoria

**Level of project:** PhD

**Working title:** Impact of the polyphagous shot hole borer and its fungal symbiont on indigenous South African trees

## Background

The polyphagous shot hole borer (PSHB) is an ambrosia beetle native to Southeast Asia. In 2017 this pest was detected on London Plane trees in the KwaZulu-Natal National Botanical Gardens, Pietermaritzburg. Its presence has since been confirmed in Durban, Hartswater, Bloemfontein, George, Knysna, Storms River Bridge and Johannesburg. The beetle has a symbiotic relationship with the fungus *Fusarium euwallaceae* which serves as a food source for the adults and their larvae. In susceptible trees the fungus causes Fusarium dieback which can lead to branch dieback and tree death. The beetles can attack a wide range of exotic and indigenous trees in urban, agricultural and natural landscapes.

PSHB is not able to complete its life cycle on all of the tree species it attacks, those that the beetle is able to breed on are referred to as 'reproductive hosts'. The current list of confirmed hosts in South Africa can be viewed at <https://www.fabinet.up.ac.za/pshb>. It is expected that this list will grow as research into this pest continues and as the pest moves to new areas. The impact of beetle attack on the more than 35 indigenous tree host species is currently unknown and may vary from complete death of the tree to mild symptoms of branch dieback or no impact. It is known already that the beetle-fungus combination can kill large coral (*Erythrina* spp.) trees and keurbooms (*Virgilia divaricata*). The impact of PSHB and *F. euwallaceae* on trees in urban, semi-natural and natural environments may also vary due to environmental factors. Therefore the aim of the project is to determine the host range and the threat posed by PSHB to indigenous trees and forests in South Africa by:

- Monitoring PSHB attack on indigenous tree species in urban, semi-natural and natural landscapes
- Determining which tree species are reproductive hosts for the beetle and if there are abiotic or biotic factors that may trigger a non-reproductive host to become suitable for reproduction
- Assessing the susceptibility of indigenous tree species to Fusarium dieback

The project is suitable for candidates interested in forest pathology, forest entomology, and ecology.

## Key contacts

Trudy Paap: [trudy.paap@fabi.up.ac.za](mailto:trudy.paap@fabi.up.ac.za)

Wilhelm de Beer: [wilhelm.debeer@fabi.up.ac.za](mailto:wilhelm.debeer@fabi.up.ac.za)

## Further Reading

Paap T, de Beer ZW, Migliorini D, Nel W, Wingfield MJ. (2018) The polyphagous shot hole borer (PSHB) and its fungal symbiont *Fusarium euwallaceae*: a new invasion in South Africa. *Australasian Plant Pathology* [10.1007/s13313-018-0545-0](https://doi.org/10.1007/s13313-018-0545-0)

<https://www.fabinet.up.ac.za/pshb>