30 Mar 2021

Urban trees primed for invasion

People's Post

Nettalie Viljoen @nettalieviljoen

Paul Barker of Barker Tree Care sets up invasive shot hole borer monitoring traps at Erinvale Estate Hotel & Spa in Somerset West.PHOTO: Nettalie Viljoen

“Resistance is futile” – this famous line was first uttered by the Borg – evil robotic aliens – in the grand finale of Star Trek: The Next Generation season three.

The episode aired in 1990 and went down as one of the most epic cliffhangers in television history. The Western Cape too is now on the edge of a precipice as an invasive alien species, hell-bent on "assimilating" trees, spreads through the country. And, as was the case with the film's imaginary threat, it will take a concerted effort to defeat this very real one.

The invasive shot hole borer (ISHB) (Euwallacea fornicatus) – also referred to as the polyphagous shot hole borer (PSHB) – is a tiny black beetle (2 mm in size) from South East Asia which, in symbiosis with a fungus called Fusarium euwallaceae, aggressively kills trees.

While the impact it could have on the agricultural sector and natural forests is of concern, preliminary findings show that urban trees will be the hardest hit.

An as of yet unpublished paper ("Invasion of the Polyphagous Shot Hole Borer Beetle in South Africa – A Preliminary Assessment of the Economic Impacts" – Research Square) conservatively estimates the mortality rate of trees (growing in a city, town or suburb) infested with ISHB at 25%.

According to the experts, this is because urban trees include those species that, as fate would have it, are very susceptible to the damage wrought by the beetle-fungus symbiosis. The top five most vulnerable trees in Cape Town include Boxelder maple, London Plane, English Oak, Liquid Amber and Coral trees. The fact that urban trees, in general, are usually stressed from the past drought only compounds the problem.

Alien invasion

First discovered in KwaZulu-Natal in 2017, ISHB has since spread to eight of the nine provinces with Limpopo being the only exception (knock on wood). In the Western Cape, it is currently confined to Somerset West and the Garden Route, but, according to Paul Barker of Barker Tree Care, it is only a matter of time before it will arrive in a neighbourhood near you. "That is if it isn't there already," he adds.

People's Post met up with Barker, who is also the horticulturist for the Friends of the Ardene Gardens (FoTag) in Claremont, at Erinvale Estate Hotel & Spa in Somerset, where he is responsible for the tree inventory and implementation of an Integrated Pest Management (IPM) programme.

The facility's garden covers 2 ha and includes about 150 trees, many of them 60 to 100 years old. Of these, about 30 are infested with ISHB, but, Barker says, the spread would have been far worse if the infestation wasn't spotted early. His approach to managing ISHB infestation includes monthly IPM visits and the deployment of ISHB traps which monitor the activity patterns of the beetles throughout the year. The traps also provide details on the numbers of the beetles to determine how effective control measures are. "In December, the trees were fine, then in the first week of January I found that the beetle had attacked some of the London Plane trees," he says.

The spread of ISHB to Somerset was confirmed in May 2019 when infected trees were found in Helderrant, La Sandra and Worlds View. Today the infestation stretches from the Vergelegen and Lourensford Estates to the R44 in Somerset.

Know your enemy

The only thing more concerning than the speed at which the beetle seems to be spreading is the fact that current uses of pesticides and fungicides have shown to have limited effect and have not proven effective at eradicating ISHB.

The Forestry and Agricultural Biotechnology Institute's (Fabi) website explains that ISHB, as an invasive, has only been studied since the early 2000s. To better understand and reduce ISHB's impact, Fabi (located on the University of Pretoria campus) has established a research network including academics from seven other universities who will collaborate on various aspects of the invasion in the different regions. Two of several research studies currently under way are being conducted at Vergelegen, Lourensford and Erinvale Hotel, in partnership with Stellenbosch University (SU).

Prof Francois Roets, associate professor at SU's department of conservation ecology and entomology, explains that a PhD study by one of his students, Heather Nependa, is looking at chemical treatments as one of the chapters. Other aspects of Nependa's research – sponsored by Vergelegen – include "socio-economic impact of ISHB" in the area and "epidemiology of ISHB" in SA.

"Lourensford has just also provided funding for an MSc student who will look at monitoring and control options for ISHB – widening our current studies on chemical treatments. This student will likely start in about three weeks," he says.

According to Roets, these studies are testing the possible use of insecticides and fungicides for the treatment of affected trees.

"The research chemicals are injected into the trees (rather than spraying) as this is likely the only effective way to treat for infestations currently, and that would not harm the environment as much as spraying or drenching."

Barker says this method prevents the chemicals from soaking through to the water table or from harming beneficial insects. "Specifically, the bees," he says.

Both these studies were initiated last year, with field trials only having commenced this year (mostly due to Covid-19). It is expected that results will only start to become clear in a year. "It takes a lot of time for trees to react to most treatments," Roets says.

Seek and destroy

While research is ongoing to find a method that will be effective in eradicating this pest without harming the surrounding environment, containment is our best, if not only, hope. To this end, the City of Cape Town Invasive Species Unit has drawn up an ISBN protocol to identify and manage the threat.

Marian Nieuwoudt, the City's Mayco member for spatial planning and environment, says the threat of losing the tree canopy is indeed great.

"Anecdotal evidence suggests that the City's tree canopy is largely made up of London Plane, English oak, Pin oak, American Sweetgum and Boxelder maple trees. These trees are very susceptible to the beetle and fungus and many of them are showing signs of stress such as branch die-back and some that are already dying," Nieuwoudt says.

According to the City's management protocol, the priority is the swift identification and removal of highly infested trees to reduce the beetle population.

"The greatest threat remains the movement of infested wood. It is, therefore, important that once a tree is spotted, we ensure that the recommended action is followed in terms of removal and that the affected material is handled correctly," says Nieuwoudt.

Call to enlist

When it comes to highly infested private and public trees, the City will be doing the removing. However, it is asking residents to take an active role in spotting and reporting possibly infected trees in their areas.

"At the moment trees that have more than an estimated 100 entry holes, showing signs of branch die-back, and some of them dead, are being removed.

"These trees are the first and highest priority and we urge residents to please be patient as we work through the list while we continue to monitor the situation. We encourage those who have opted to treat their trees to please keep on monitoring whether or not there is any improvement," Nieuwoudt adds.

Barker advises civic organisations to be proactive by setting in place an IPM system, starting with a tree management assessment (age, health and risk) of the trees , combined with active monitoring for the symptoms of ISHB.

"And whatever you do, do not move firewood. If you are going for a braai at a friend's house, buy charcoal. It only takes one piece of infected wood for this beetle to spread from one suburb to another," he cautions.

V For information on how to identify and report ISHB, go to https://www.capetowninvasives.org.za/shot-hole-borer. Contact Paul Barker on barkertreecares@gmail.com.