

10 Aug 2019

Finally: A solution to get rid of the beetle that is killing SA's trees

news24

Riaan Grobler



A dead street tree taped by a local activist to raise awareness of the danger they pose. (Supplied)

A new technology developed by a South African company is the first to prove effective in killing the polyphagous shot hole borer, a tiny beetle that has been killing trees worldwide at an alarming rate.

The beetle, a native of southeast Asia, is no bigger than 2mm, but carries a fungus that kills trees. It has been spotted in every province except Limpopo and, until recently, there was no way to stop it.

But Parys-based company Pan African Farms has come up with a solution to rid trees of the borer. The treatment got the go-ahead from the Department of Agriculture, Forestry and Fisheries in June, which means it can be used as an agricultural remedy.

Professor Marcus Byrne, an Ig Nobel prize winner and entomologist at the University of the Witwatersrand, earlier [told News24](#) that the beetle bores tunnels into tree trunks where it spreads the fungus *Fusarium euwallaceae*, which effectively cuts off the trees' vascular system, causing them to die.

"It's an ambrosia beetle, which means it carries a fungus which it feeds its babies on. When it introduces that fungus into trees that have never experienced it before, it threatens those trees with illness or death."

Byrne says no one truly knows how the beetles made their way to South Africa.

"We happen to be a very connected world, and trade today allows for the movement of goods all around the world. We're not very good at screening these animals that hitchhike around the world on our consumer goods."

Unique, eco-friendly and smaller than a cell

Piet Meyer, CEO of Pan African Farms, told News24 the company has managed to develop a unique, eco-friendly solution using nanotechnology.

"The core of our technology is nanotechnology," Meyer says. "Our vesicle, as far as I could determine, is the smallest in the world at 10 nanometres.

"To give you some perspective: The smallest living cell is 10 microns. Our vesicle is 1 000 times smaller than that.

"That enables it to penetrate through most known barriers."

Meyer says all fungi, including *Fusarium*, have a cell wall.

"This wall has always been regarded as impenetrable, but with our vesicles there's an instant passage through that wall. The fungus can then be killed through a series of cellular attacks."

And this is the only way to kill the polyphagous shot hole borer - by killing what it feeds on. Ultimately, the fungus is destroyed and the beetles die of hunger.

"After 24 hours of applying this to the bark of a tree, we could trace it to about 10-and-a-half centimetres into the tree. That distinguishes this product from anything else."

Meyer says other fungicides used today are expensive, labour-intensive and become ineffective after a while.

Picture a tennis ball

The best he can explain the vesicles, Meyer says, is to picture a tennis ball. That 'ball' is called an Anods - which stands for amphiphilic nano oil-delivery system.

"A tennis ball is hollow inside and surrounded by rubber. In the Anods, the 'rubber' part is then surrounded by fatty acids, and the hollow part is filled with the active ingredient needed to kill the fungus."

According to Meyer, conventional pesticides are ineffective because of drug resistance as pests adapt, much like antibiotics in humans.

"But we have found suitable natural active ingredients that can destroy the *Fusarium* fungus. It is non-toxic and it won't harm your tree."

Meyer says after application, the beetles pour out of trees in droves. "We found that there was no trace of the fungus left."

Grave concern

The local beetle infestation was first noticed in 2017 by Dr Trudy Paap – a postdoctoral fellow at the Forestry and Agricultural Biotechnology Institute (FABI) at the University of Pretoria – in the KwaZulu-Natal National Botanical Gardens in Pietermaritzburg, and it has since been found nationwide, including in Johannesburg and as far as the Northern Cape.

Johannesburg has what is considered one of the world's largest urban forests with an estimated 10 million trees.

According to Andrea Rosen, co-director of the Johannesburg Urban Forest Alliance, the infestation is spreading fast.

"The polyphagous shot hole borer is of grave concern," Rosen told News24 last year.

"Some projections go up to half a million trees that are affected in Johannesburg alone, which is a substantial part of our urban forest canopy," Rosen said.

According to Meyer, that figure could be as many as 1.8m trees in the greater Johannesburg area.

"In urban areas, municipalities will have to act quickly to stop the spread of the borer beetles and save the trees that have already been infected.

"Each female beetle lays 20 eggs at a time in the bark of a tree. The life cycle is around 40 to 45 days and 60% of the population is female. According to my calculations, in 10 months, a single beetle can multiply to 50m. That is an alarming figure.

"What worries me is that the beetles could spread to the Kruger National Park and the Knysna Forest."



agriculture, forestry & fisheries

Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

REGISTRAR: ACT NO. 36 OF 1947/REGISTRATEUR: WET NO. 36 VAN 1947

Agriculture Building/Landbou, Beatrix Street /Straat, PRETORIA
Private Bag/Privaatsak X343, PRETORIA, 0001
Visit our web site at www.daff.gov.za/act <<http://www.daff.gov.za/act-36/main.htm>>

Inquiries/Navrae: Portia Mjole • Ref/Verw: 20/1/1/L10670
Tel: (012) 319-7224 • Fax: (012) 319-7179 • e-mail: PortiaM@daff.gov.za

13 June 2019

Ms. Adriana Murray
Pan African Farms (Pty) Ltd
31 A Unie Street
PARYS, SOUTH AFRICA
9585

Dear Ms. Murray

RE: REGISTRATION OF AGRICULTURAL REMEDIES.

1. The above matter refers.
2. Kindly be informed that the application registration of the following product has been approved.


- **PSHB FUNGICIDAL (L10670)**

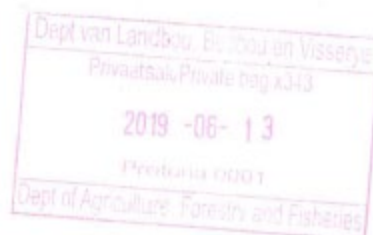
Remarks: Please note that the registration is approved on condition that additional monitoring must be submitted to the Registrar's office by 13 June 2021.

3. Attached is the certificate of registration and approved label for the above mentioned product.
4. This approval is valid until the **31 May 2022**.

Trusting the above is in order.

Yours faithfully


REGISTRAR: ACT NO. 36 OF 1947



The approval certificate from the Department of Agriculture, Forestry and Fisheries. (Supplied)

Spreading all over SA

The beetle has also spread to Cape Town.

"The first sighting was confirmed on 3 April 2019 in Somerset West," Cape Town mayoral committee member for spatial planning and environment Marian Nieuwoudt told [News24](#).

So far, the identified infestation in Cape Town is limited.

"At this stage the only positive sightings have been confirmed in the Somerset West area. Recently a sighting 1km away from the first positive sightings has been confirmed," said Nieuwoudt.

Possible PSHB infestations in several native tree species in Southern Cape: ID of beetle & fungus still need to be confirmed and eventual impact monitored. [#pshb @Fabiteam1 pic.twitter.com/Bjin7eC0Tq](#)

For now, urban residents who notice the beetle in their gardens can buy the product directly from Pan African Farms

"We have priced it to be user-friendly. They can then apply it to municipal trees growing on their sidewalks too, until such time as municipalities start using it," Meyer says. "This is happening in the north of Johannesburg right now.

"In Bloemfontein, for example, members of the community got together and decided to tackle the problem themselves."

Signs of infestation

Signs of an infestation include wilted or missing leaves, dead or dying branches, as well as tiny and randomly spaced holes in the bark. These holes could have staining around them, or a white powder or gum-like blobs oozing from them.

"It looks like the trees are weeping," says Meyer.