My Horticultural journey with IPPS

PENDULO GABAYI, 2016 IPPS SA EXCHANGE STUDENT

22 March 2016

IPPS

SHARING PLANT PRODUCTION KNOWLEDGE

IPPS Australian Exchange 2016 feedback

Mpendulo Gabayi


Almond


Welcome to
ENGALE'S
NURSERY
Growing Since 1946


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SANBI
Biodiversity for Life
South African National Biodiversity Institute

International Plant Sentinel Network

Plant Pest Monitoring and Prevention Workshop

Kirstenbosch National Botanical Garden

(Old Mutual Conference Centre)

6-7 November 2017

RSVP: Mpendulo Gabayi (m.gabayi@Sanbi.org.za)

The **International Plant Sentinel Network** (IPSN) aims to provide an early warning system to identify new and emerging pest and pathogen risks to plants. The IPSN is a developing network of both national and international partnerships linking plant protection scientists and botanical gardens and arboreta around the world.

Background Identifying potential threats to plant species before a pest is introduced can drastically improve the success of eradication or management programmes. It may even be possible to stop their introduction in the first place. A big problem in identifying these plant health risks is that the most serious invasive pests do not cause a problem in their native habitats. This is where sentinel plants can help

Sentinel Plants Plant species maintained outside of their natural ranges (e.g. in botanical gardens and arboreta) offer a unique opportunity to understand and predict potential threats to plant health. So–called sentinels can be monitored for damage by pests present in their current location, but which are not currently introduced into the sentinel's country of origin. Monitoring sentinels can help identify potential future threats, as well as provide vital information about key organisms already identified as a risk.

To find out more and how to become a member please go to:
www.plantsentinel.org

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Department for Environment Food & Rural Affairs · fera · JKI · DIBAF · BGCI · Forest Research

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FABI

A Guide to Biosecurity Best Practice for Living Plant Collections: Launch and training workshop

25–26 October 2022

Kirstenbosch National Botanical Garden
Old Mutual Conference Centre (Gate 1)

RSVP: Mpendulo Gabayi: m.gabayi@sanbi.org.za / 021 799 8496

The Guide to Biosecurity Best Practice for Living Plant Collections was initiated by members of SANBI's Horticultural Enrichment Forum (HEF), as part of an effort to streamline and standardise horticultural practices in SANBI's National Botanical Gardens (NBGs). The protocols have been developed by a small team of SANBI horticulturists, in collaboration with staff of the Forestry and Agricultural Biotechnology Institute (FABI).

You are cordially invited to join us for this launch and workshop, hosted by the SANBI Horticultural Biosecurity Steering Committee and Dr. Trudy Paap (FABI), with special guest Dr. Brett Summerell (Chief Scientist & Director of Research, Australian Institute of Botanical Science). We hope you can join us for this capacity building event, aimed at promoting plant health and biosecurity in our SANBI gardens.


Mpendulo Gabayi
SANBI


Roger Oliver
SANBI


Phakamani M'Africa Xaba, SANBI


Adam Harrower
SANBI


Brett Summerell
Sydney RBG


Trudy Paap
FABI


Felipe Balocchi
FABI

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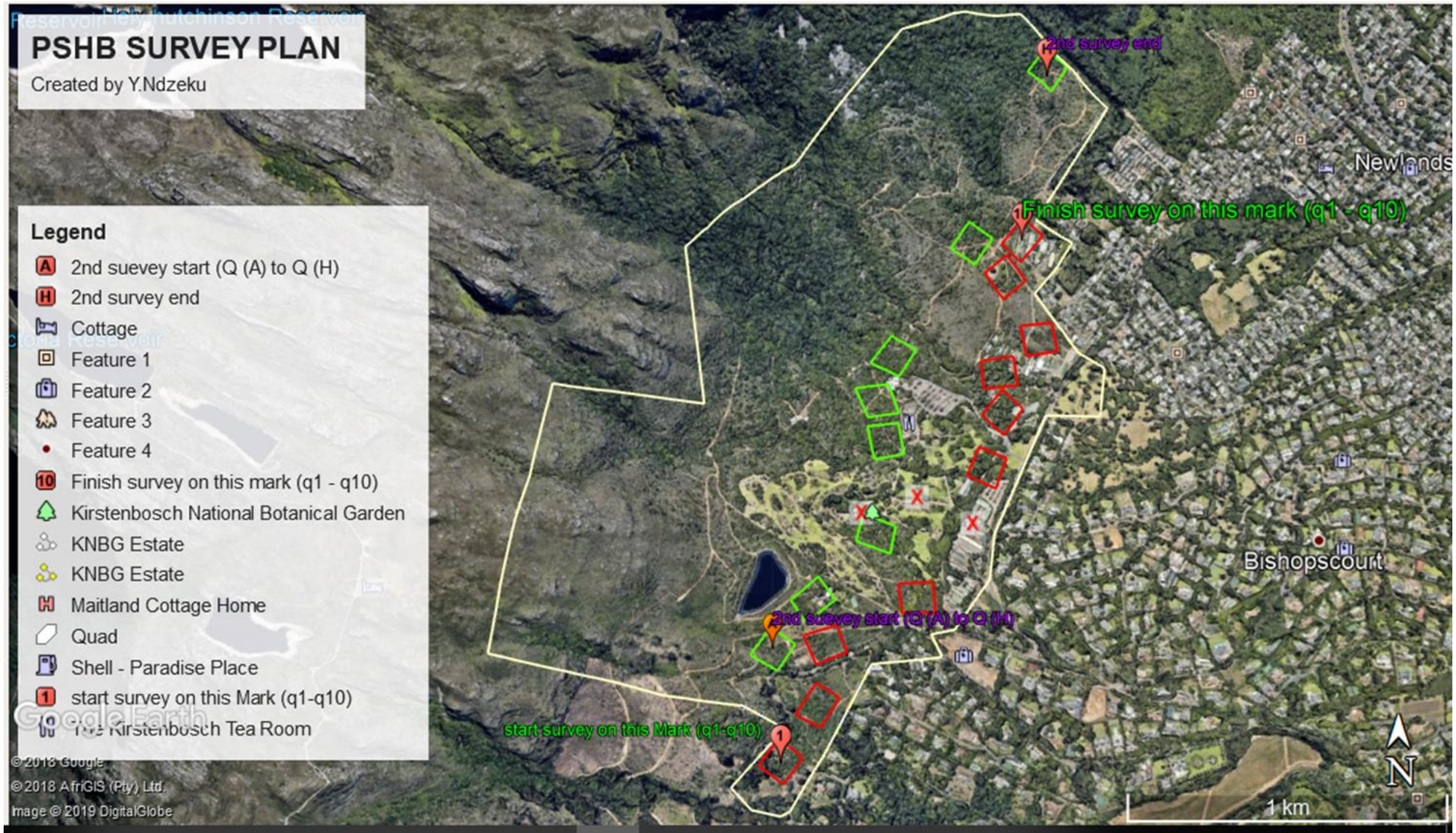
Surveillance/monitoring for early detection of Polyphagous shot hole borer



Shot-Hole Borer
a threat to our trees

Polyphagous Shot-Hole Borer (PHSB) is a recently detected invasive pest that is killing our trees. It is a tiny, flying, black beetle, ±2 mm long (smaller than a sesame seed), that originates in Asia. It is spreading fast in Johannesburg, Durban, Richards Bay, Pietermaritzburg, George, Knysna and Bloemfontein and it is now also in the Cape Town area. It has not been seen in Kirstenbosch, yet. A team is surveying the trees and monitoring the situation.

What does it do?

The beetles tunnel into trees

The beetles bore into the trunks and branches of trees, making tunnels, where they lay their eggs. They can form large colonies, with over 100 000 beetles in the tunnels.

The beetles carry a fungus

The female beetles carry a fungus, which grows in the tunnels. The beetles and their larvae, feed on this fungus.

The fungus kills the tree

The fungus causes Fusarium Dieback. It gets into the growing tissue of the tree, blocks the flow of water and nutrients, which causes dieback and kills the tree.

Know the symptoms:

It attacks trees indiscriminately, all trees are at risk. Symptoms vary from tree to tree.

1) Entry holes on tree trunks

They are round and small, less than 2 mm wide.

2) Signs of infestation:

Dark wet staining around the holes AND/OR
Gum or resin oozing or dripping from the holes AND/OR
Raised lesion or callus around the holes AND/OR
White powder or fine sawdust coming from the holes.

3) Dieback

Wilted brown leaves and dead branches.

HELP STOP THE SPREAD:

Know the symptoms, check and monitor the trees in your garden and neighbourhood.

Report all sightings to invasive.species@capetown.gov.za or Tel. 0860 103 089; or upload photos and GPS coordinates to www.capetowninvasives.org.za and on Tree Survey at https://treesurvey.co.za (download their app) and on iNaturalist at https://www.inaturalist.org/posts/23278-pshb-in-cape-town

Get professional help to dispose of infected trees to make sure to kill the beetles and to dispose of infested trees in a manner that prevents the spread of this invasive pest.

Don't move firewood, if it is infested with even one live female beetle, you will aid the spread.

More information: www.capetowninvasives.org.za/shot-hole-borer ; https://www.fabinet.up.ac.za/ ; https://polyphagous-shot-hole-borer.co.za

FABI · CITY OF CAPE TOWN ISIXEKO SASEKAPA STAD KAAPSTAD · iNaturalist.org · SANBI South African National Biodiversity Institute

Propagation of a critically endangered medicinal tree, *Brackenridgea zanguebarica* Oliv (Ochnaceae).

Mpendulo Gabayi
Conservation horticulturist (Trees, shrubs and Forest understory collections)
Kirstenbosch National Botanical Garden

Global Partnership for PLANT CONSERVATION 2018

Kirstenbosch National Botanical Garden

KIRSTENBOSCH NATIONAL BOTANICAL GARDEN

DESCRIPTION

Kirstenbosch National Botanical Garden, founded in 1913, is world-renowned for the beauty and diversity of the Cape Floral Kingdom it displays as well as its incomparably magnificent setting against the eastern buttress of Table Mountain. The Kirstenbosch

ACCREDITED ARBORETA

LEVEL I ACCREDITED ARBORETA

LEVEL II ACCREDITED ARBORETA

LEVEL III ACCREDITED ARBORETA

LEVEL IV ACCREDITED ARBORETA

VIEW ALL ACCREDITED ARBORETA

ACCREDITATION CRITERIA

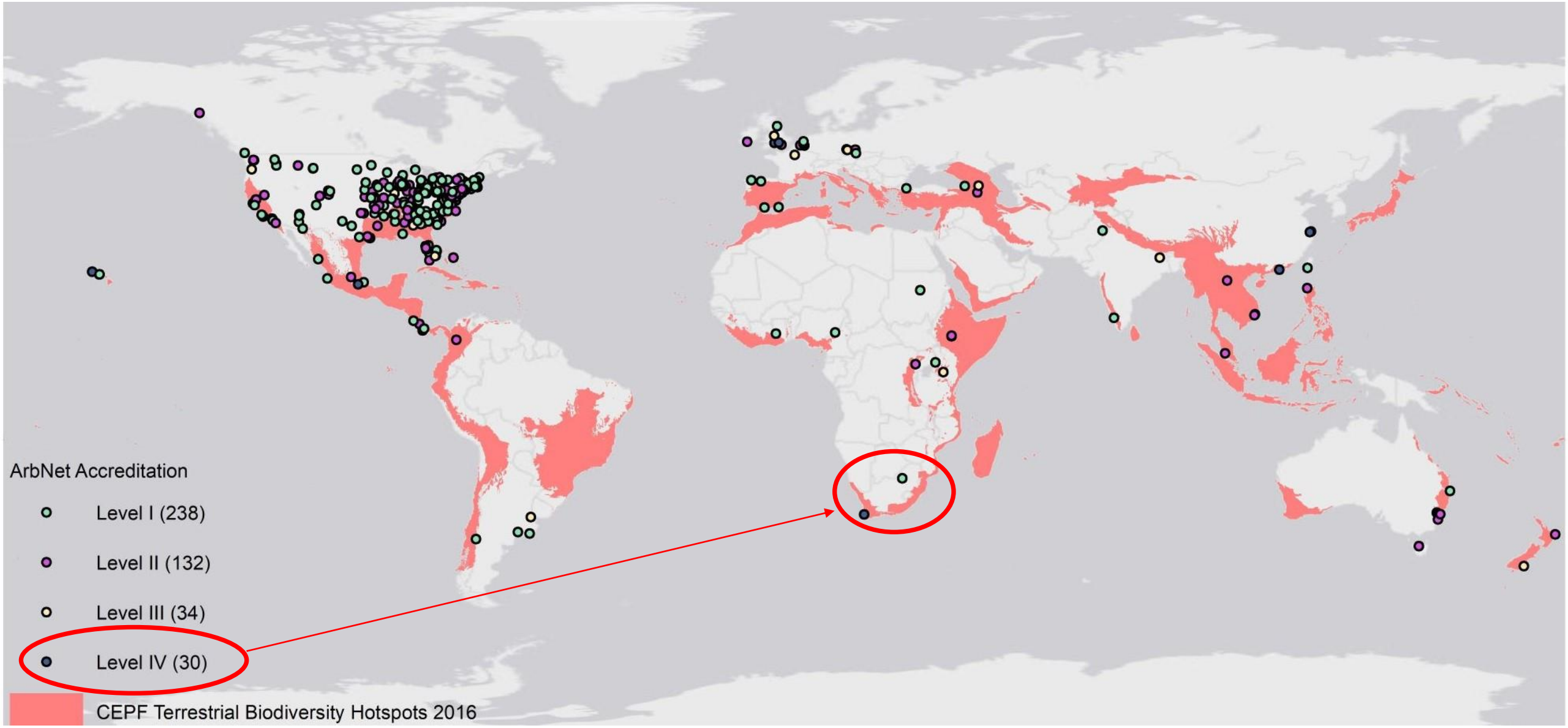
APPLY FOR ACCREDITATION

LEVELS OF ACCREDITATION

LEVEL I CRITERIA

LEVEL II CRITERIA

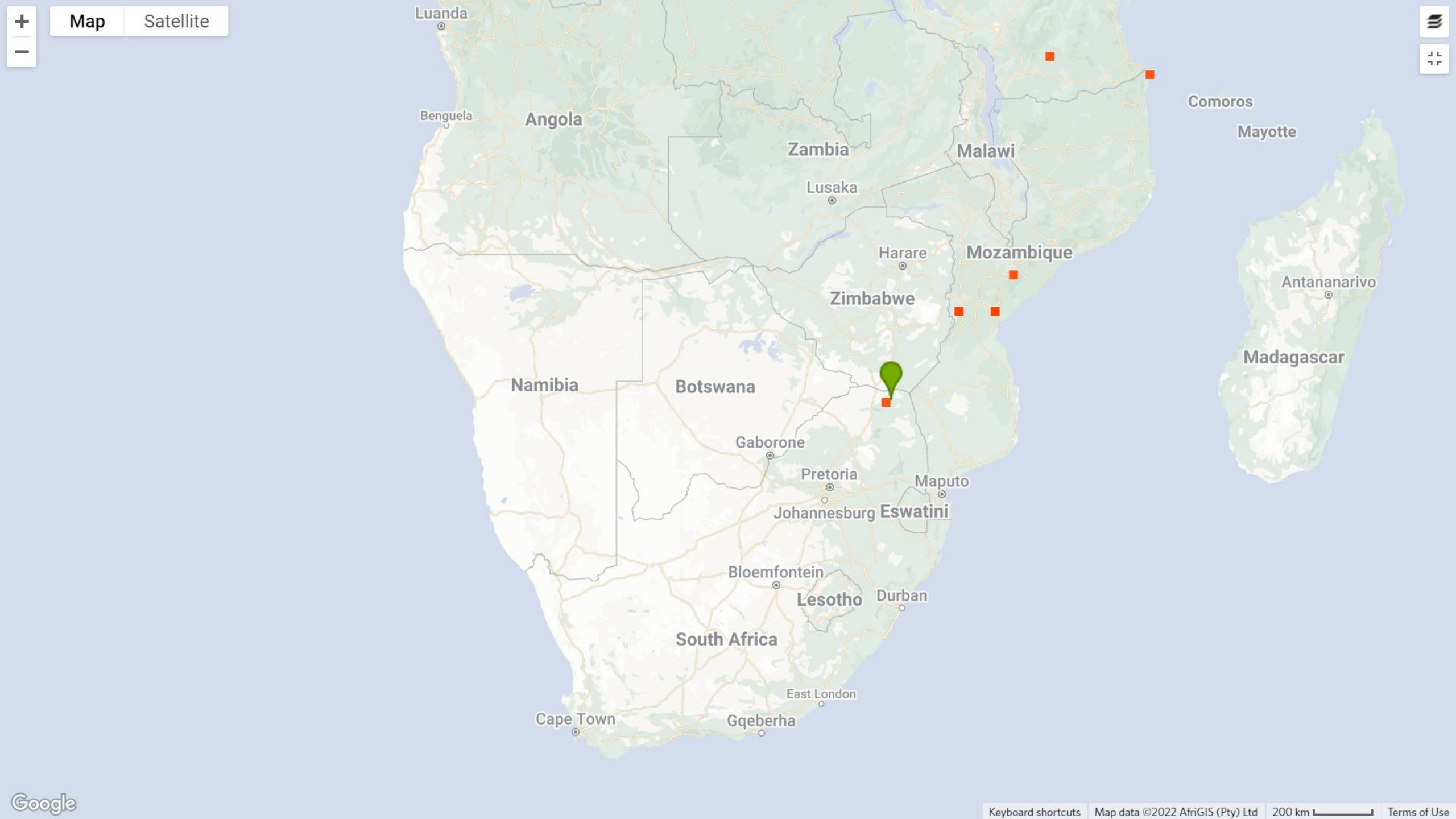
LEVEL III CRITERIA


ArbNet Accreditation
Level I (238)
Level II (132)
Level III (34)
Level IV (30)
CEPF Terrestrial Biodiversity Hotspots 2016

Mutavhatsini Nature Reserve

- The Brackenridgea or better know as Mutavhatsindi Nature Reserve was established in 1987 by the provincial Limpopo Department of Economic Development, Environment and Tourism (LDEDET) as a way of protecting the population of *Brackenridgea zanguebarica.*
- The reserve is about 110 ha, fenced with currently onlybfive rotating field rangers.


110 Ha
3D
Capture this view


Map
Satellite
Luanda
Benguela
Angola
Zambia
Malawi
Lusaka
Comoros
Mayotte
Harare
Mozambique
Antananarivo
Zimbabwe
Madagascar
Namibia
Botswana
Gaborone
Pretoria
Maputo
Johannesburg
Eswatini
Bloemfontein
Lesotho
Durban
South Africa
East London
Cape Town
Gqeberha
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Map data ©2022 AfriGIS (Pty) Ltd
200 km
Terms of Use

Some of the myths about the tree

Pers. Mr. Ntanganenzeni (BNR senior ranger), Mr. Mutshinyalo (NBG director) and Mr Ndou (local traditional healer)

- After collecting the root or bark for medicinal purposes, it is prohibited to bring the collected material inside the home yard.
- You must also not put them anywhere near a woman or allow a woman to touch it.
- It is claimed that when some of the trees had been damaged during the construction of a road through the area some years ago, the operator of the bulldozer died that same day in an accident.
- The traditional medical practitioners believe that the roots or bark should only be collected by a nude person at midnight.
- Some of the residents believe that the inhalation of smoke from this tree can cause mental disorder.









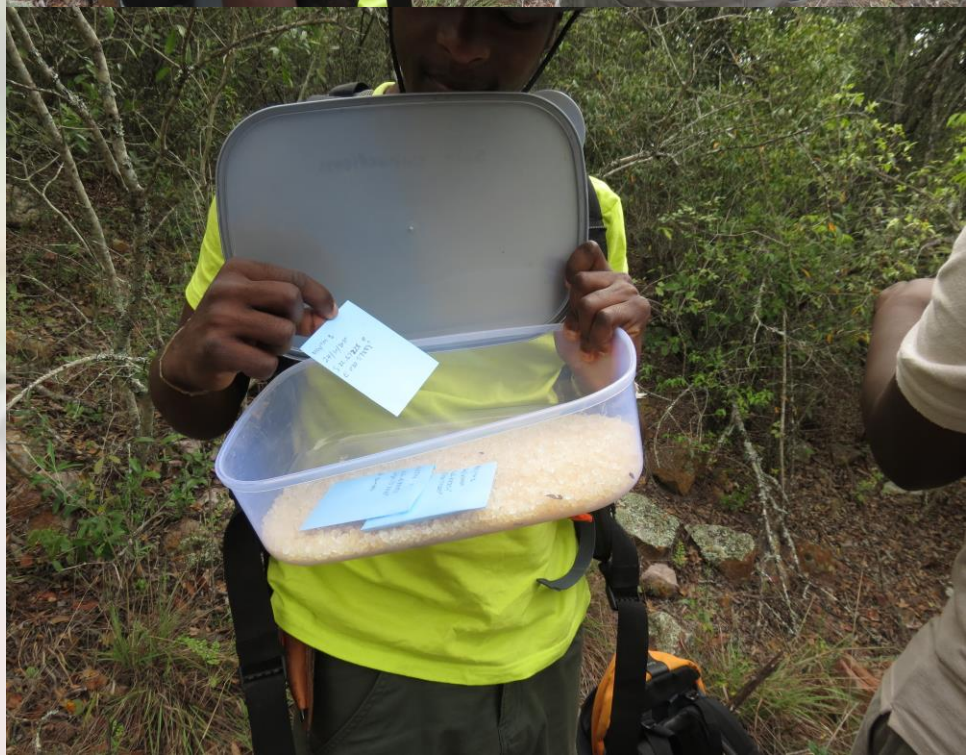
Aims for the project

To successfully develop germination and stem cutting propagation procedures for the heavily exploited and critically endangered South African tree *B. zanguebarica*.

Objectives

Conduct an expedition to locate and collect propagules.

Activities: Map all existing trees and collect genetically representative samples of DNA, herbarium vouchers, seed, and cuttings from each individual.



Objectives continues…

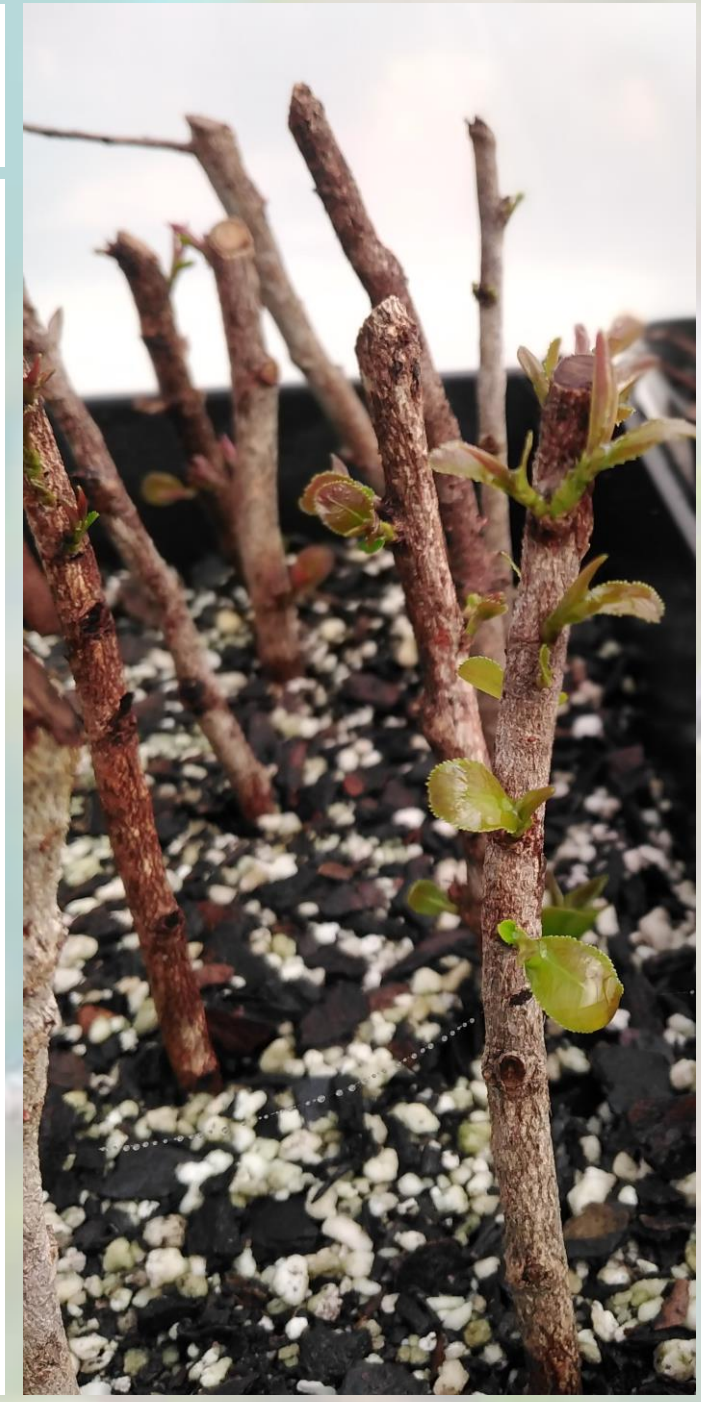
- Conduct germination trials

***Activities*:** Germination trials will expand on previous efforts and will include nicking seeds and soak overnight in water to test imbibition.

- Conduct vegetative propagation trials

***Activities*:** Making cuttings from matured materials (second year growth of stems) with adequate leaves for rooting energy, 2) also trial stem, heel and tip cuttings using different concentrations and combinations of rooting hormones (IAA,IBA & NAA).

Do air layering on site. Propagation staff at MBG to provide consultation for vegetative propagation trials.



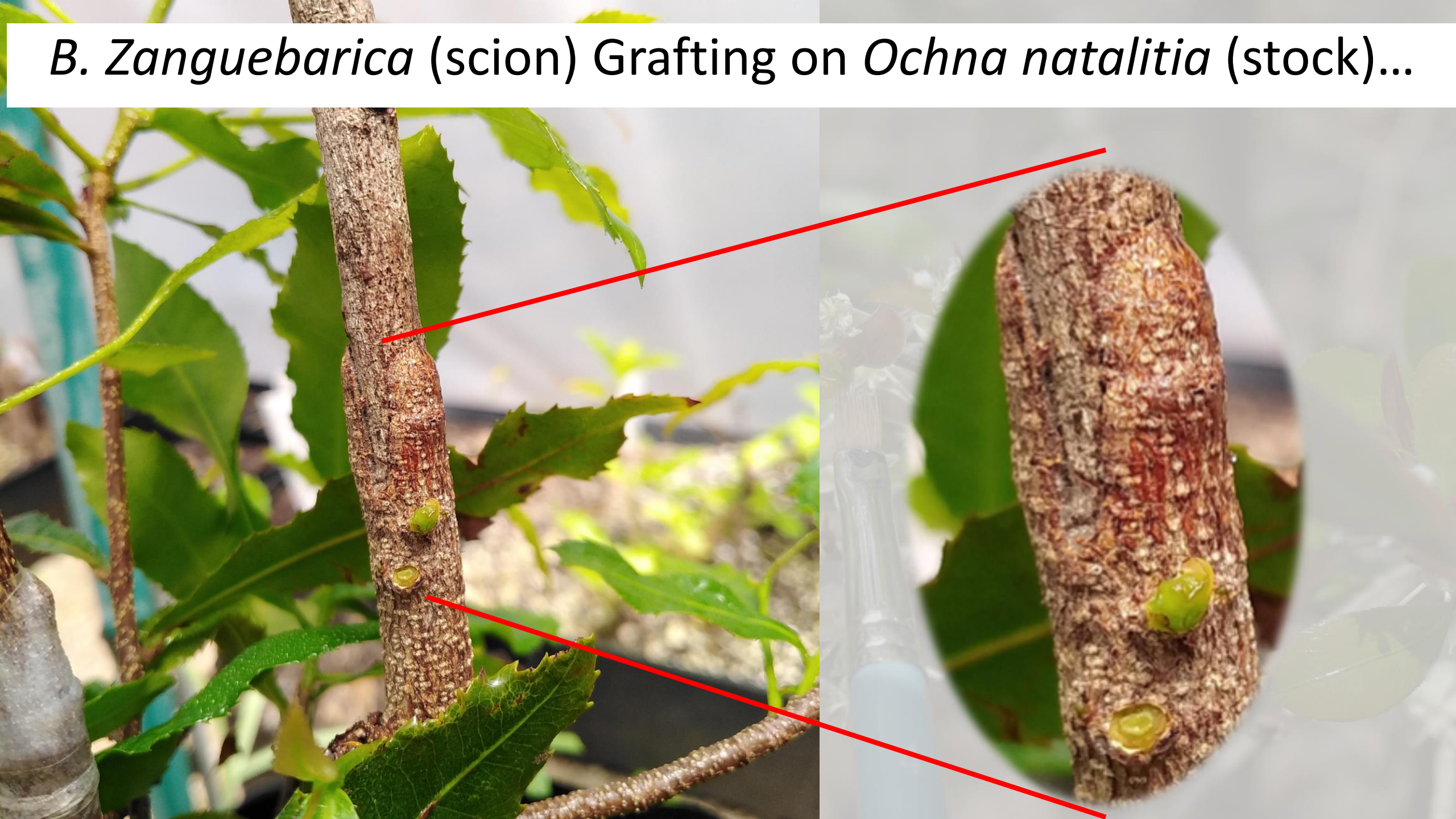
Objectives continues…

- Share information from propagation trials to facilitate conservation and recovery

***Activities*:** Sharing information with the Mafukani and Thengwe village on contemporary plant collection legislation. Methods for propagation and cultivation will be shared with managers at Brackenridgea Nature Reserve as a written report including other conservation groups in South Africa, with the goal of protecting the remaining diversity of *B. zanguebarica* in Limpopo.

B. Zanguebarica (scion) Grafting on *Ochna natalitia* (stock)

B. Zanguebarica (scion) Grafting on *Ochna natalitia* (stock)…



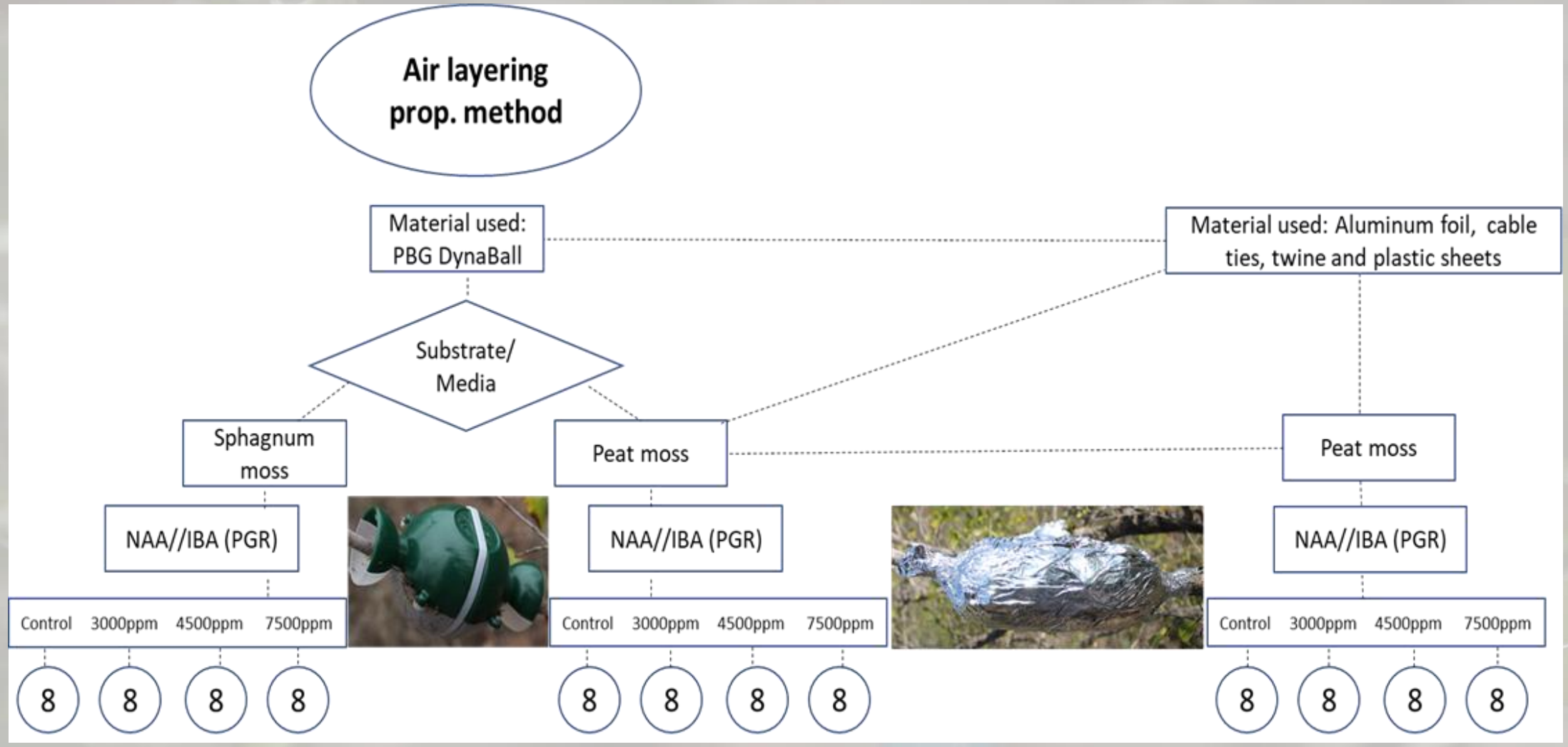
Hand pollination and seeds germination

It is suspected that the seeds are parasitised

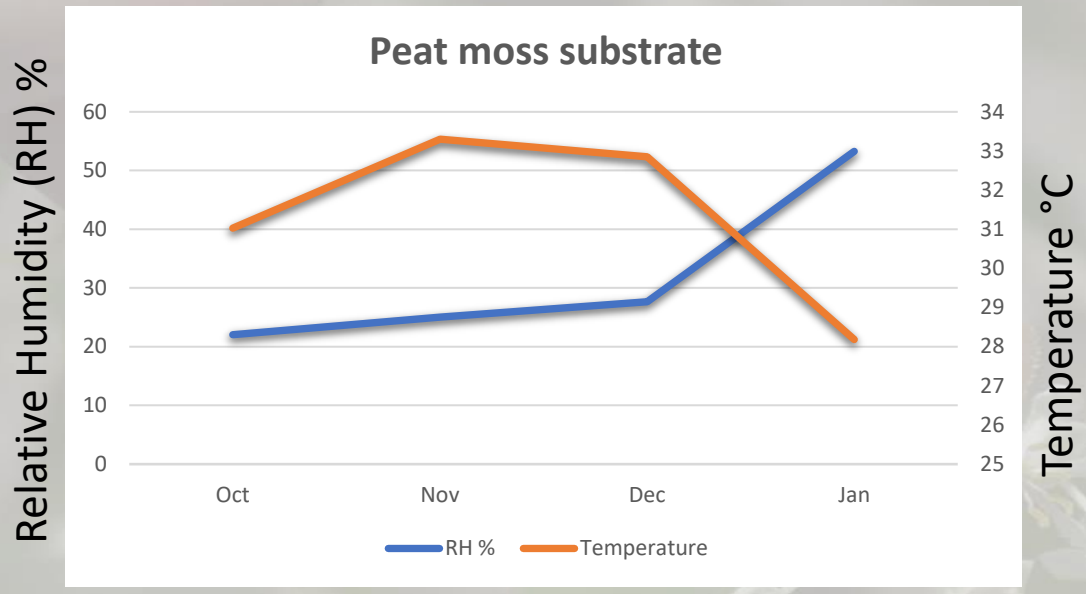
Covering the flowers for seed collection

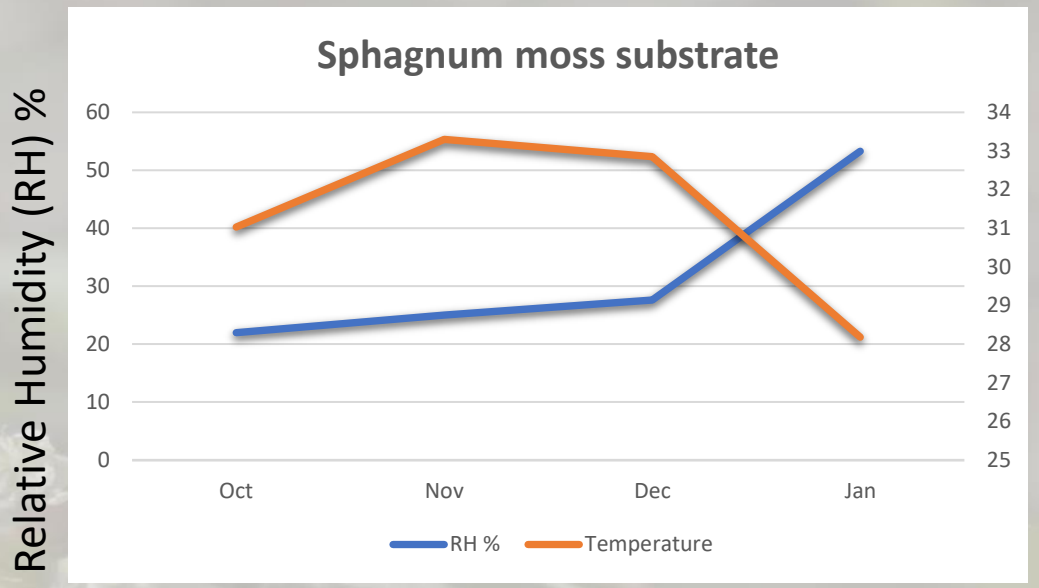
Air layering with DynaBall Root cloners (PBR inter.)

A diagram representing an air layering propagation method conducted at Mutavhatsindi Nature Reserve.



Air layering with DynaBall Root cloners (PBR inter.)


Peat moss substrate
Relative Humidity (RH) %
Temperature °C
60
50
40
30
20
10
0
34
33
32
31
30
29
28
27
26
25
Oct
Nov
Dec
Jan
RH %
Temperature


Sphagnum moss substrate
Relative Humidity (RH) %
Temperature °C
60
50
40
30
20
10
0
34
33
32
31
30
29
28
27
26
25
Oct
Nov
Dec
Jan
RH %
Temperature

Air layering with Traditional plastic and foil

Healthy plant

Diseased, dying plant

Healthy roots become infected and the cycle continues.

Cyst

Once inside the root, it develops into a threadlike mycelium that grows between and into plant cells.

Zoospores attach to the root and form a cyst that breaks into the root.

Mycelium

Infection begins at root tips and grows rapidly, killing the root as it grows.

Zoospores

Chlamydospore

Sporangia release zoospores that swim in water, attracted by chemical signals from healthy, growing roots.

Sporangium

Sporangia and chlamydospores form on the mycelium.

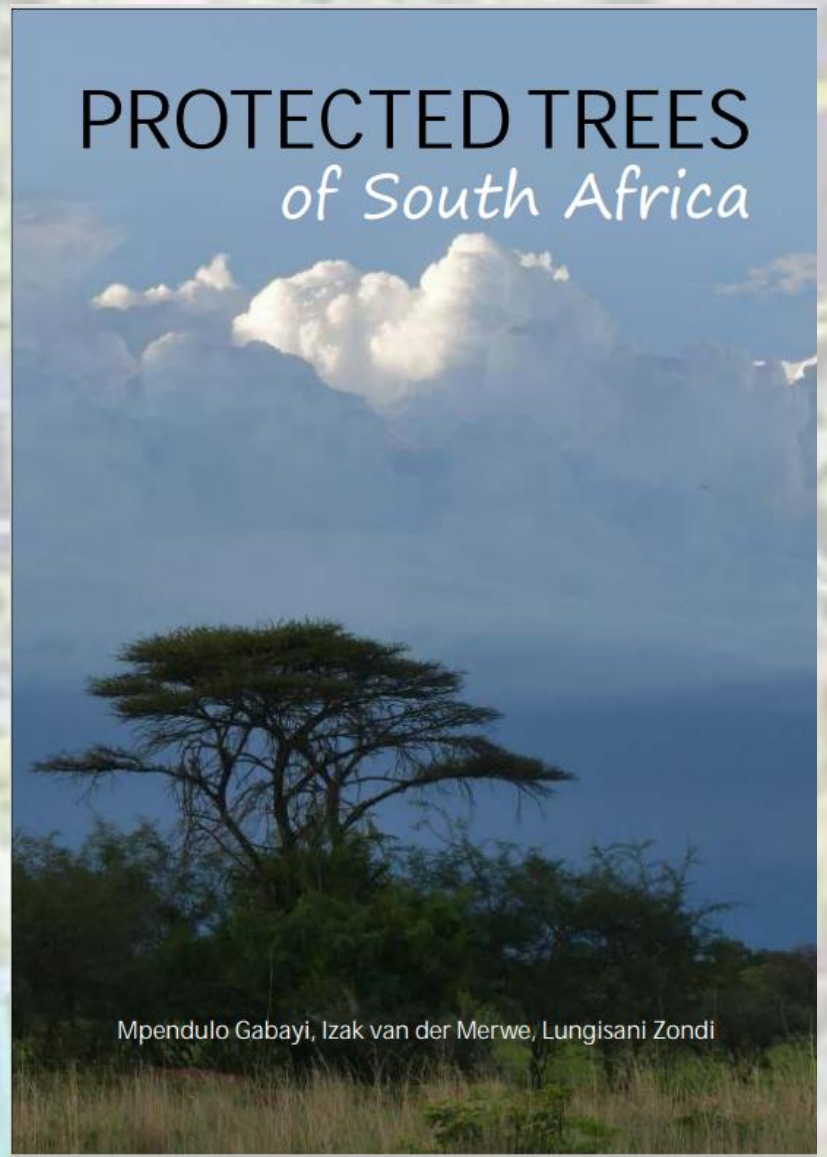
Chlamydospores can survive harsh conditions. When favourable conditions return they germinate to produce mycelia and sporangia.

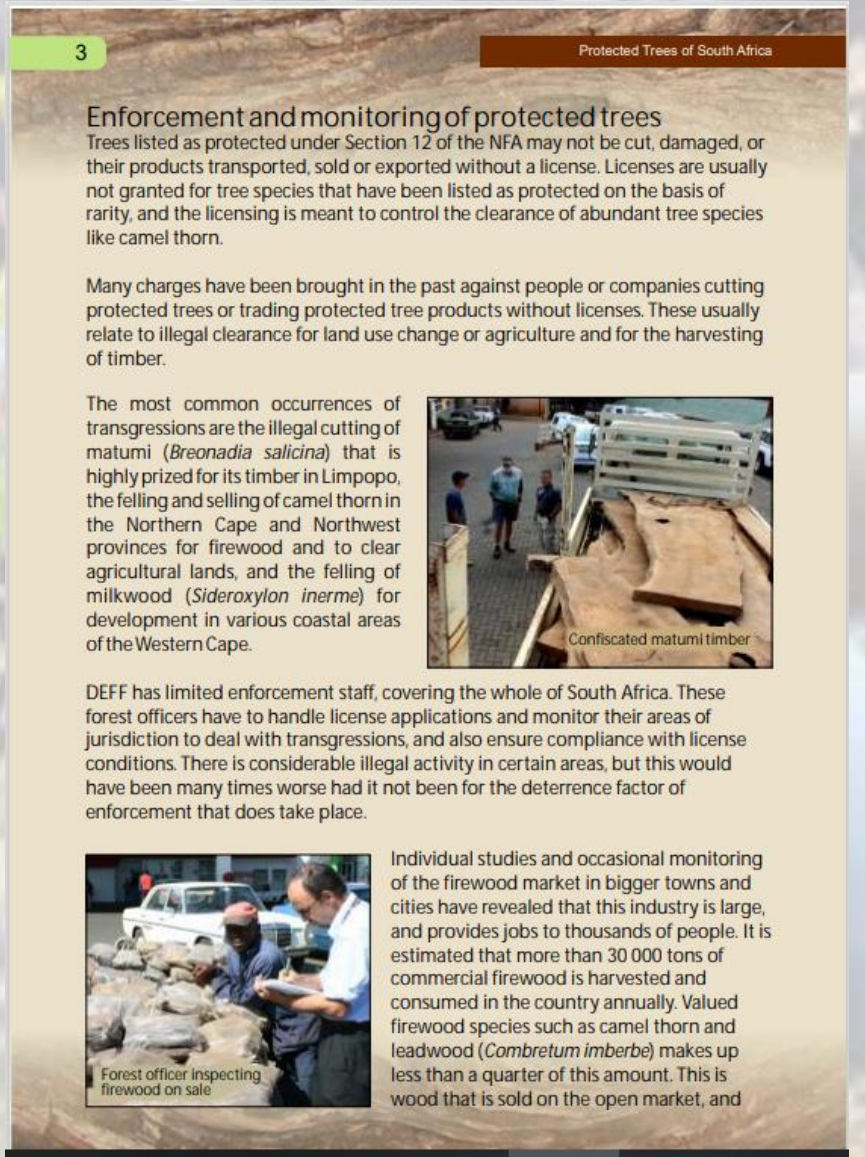
The life cycle of *Phytophthora*

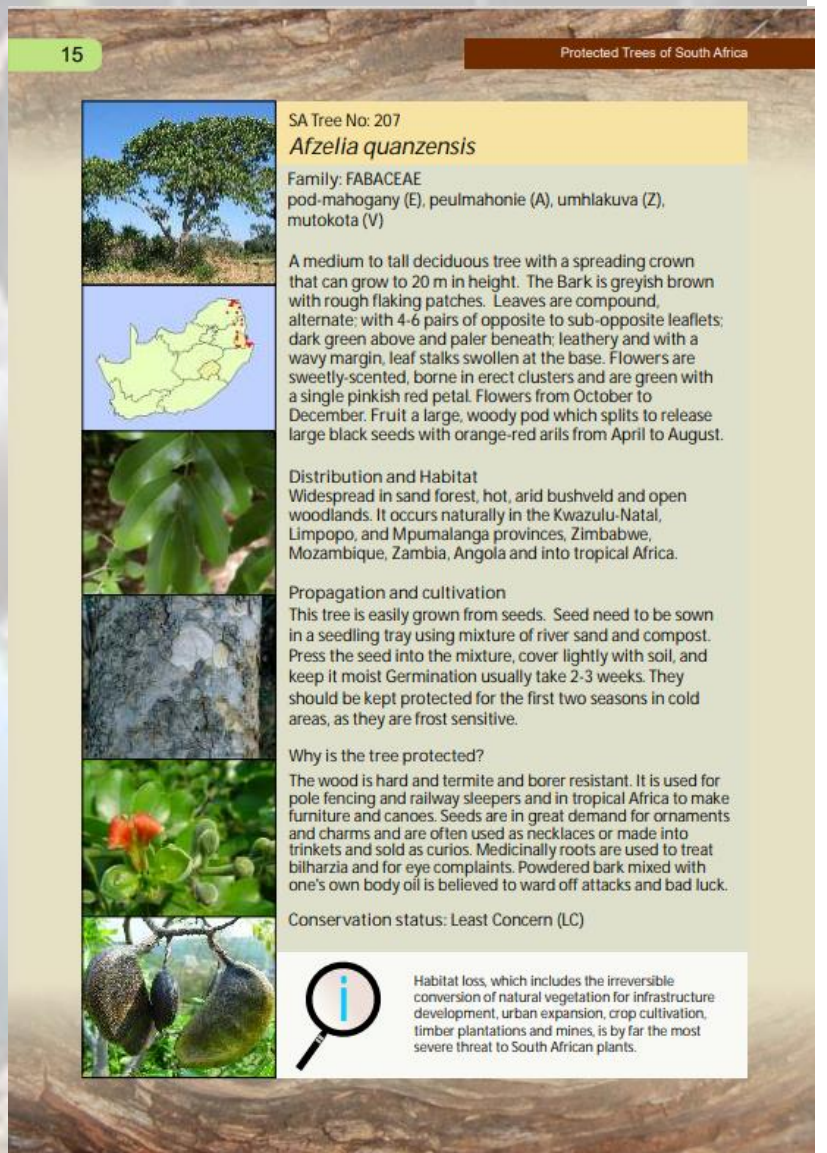
Way forward

- Set up air layering propagation trials using sphagnum moss as a substrate/ media and adjust IBA, IAA and NAA separate and in combination during growing season (September 2022).
- Set up a much more focused study on seed physiology, viability and germination, at Missouri Botanical Garden (mid 2023).
- Setting up a *Brackenridgea* working group/ task team with Michele Hofmayer (Tweenstreams nursery) and Tim Neary (SAPPI). (in progress)
- For lineage study, to locate other *Brackenridgea* populations in Zimbabwe, Mozambique and Tanzania (budget permitting).

A glimpse to a South African Protected trees booklet







AETFAT Congress in Zambia (training)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MILLENNIUM
SEED BANK
PARTNERSHIP
Kew


ArbNet
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BGCI
Plants for the Planet


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ECONOMIC DEVELOPMENT, ENVIRONMENT & TOURISM


PBR
INTERNATIONAL
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MISSOURI BOTANICAL GARDEN