

Nosipho Phiwokuhle Ndlovu

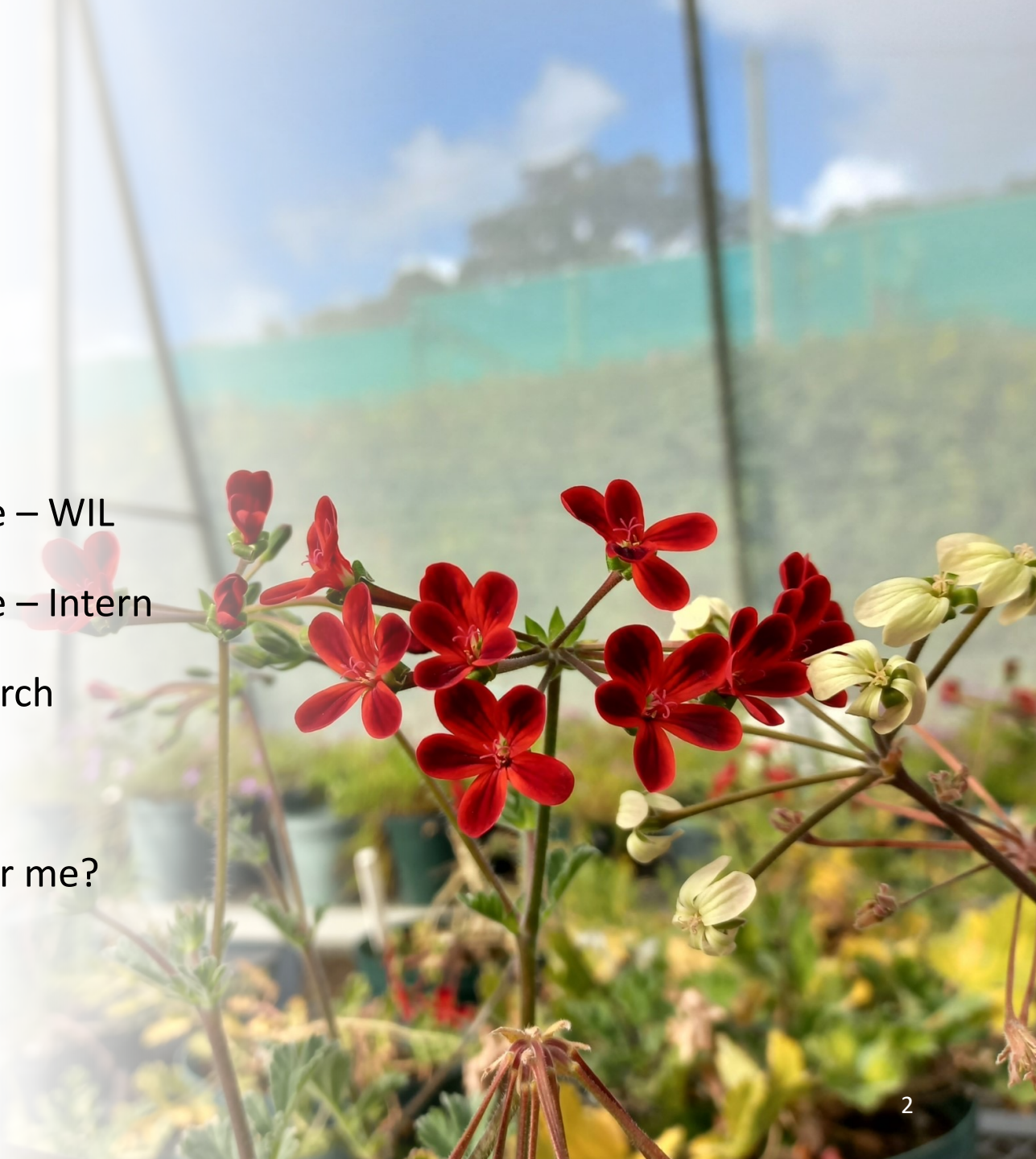
Australian IPPS student exchange nominee
2024

Nominator: Mpendulo Gabayi



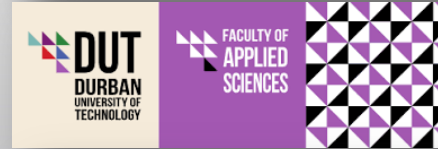
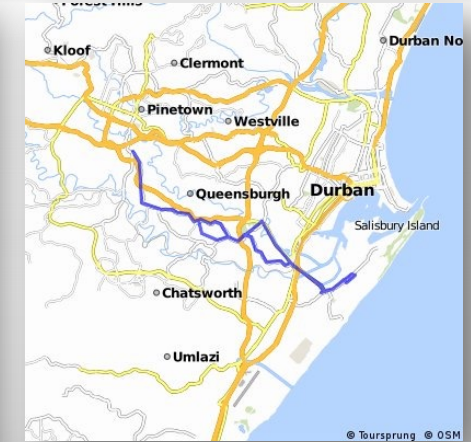
Contents to be covered

- Background
- Horticultural experience – WIL
- Horticultural experience – Intern
- Plant propagation research
- Field of interests
- Why this opportunity for me?
- Conclusion
- Acknowledgements



Background

- Come from a small area in KZN, Pinetown
- National Diploma: Horticulture
- Advanced Diploma: Sustainable Horticulture
- Postgraduate diploma: Conservation Horticulture
- Small company – Seasonal Veggies



Horticultural experience

South African National Biodiversity Institute (SANBI) – Work Integrated learning

Activities

- Redevelopment of garden section
- Propagation trails
- Assisting with maintenance
- Seed collection (Annuals)



Horticultural experience - WIL

Garden visits



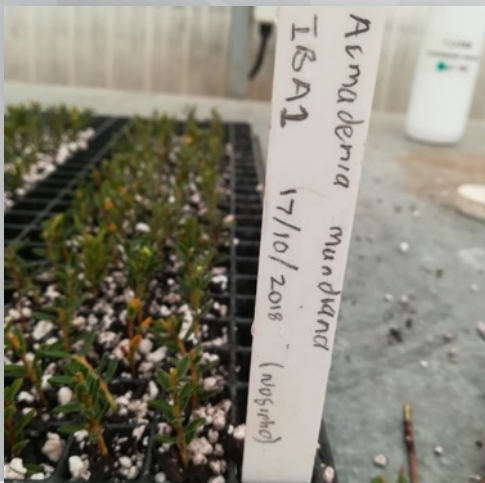
Flower festival



Specimen Stand



A. mundiana trails



Seed smoking

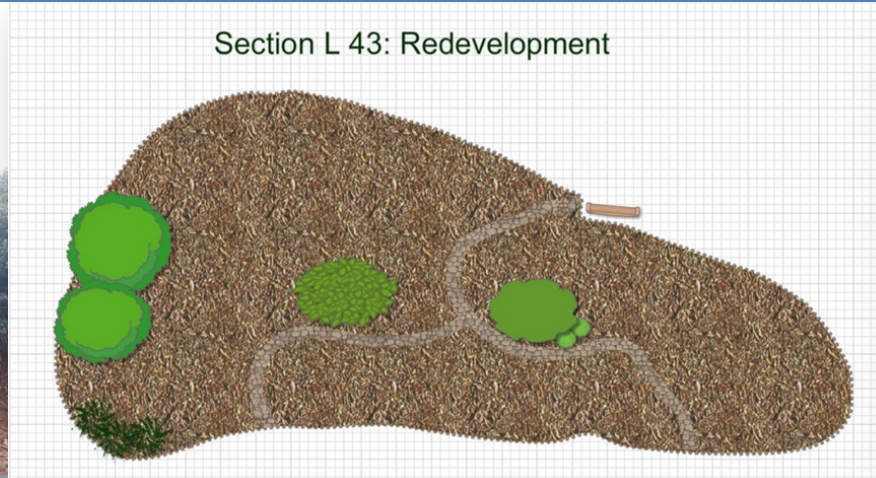


Plant photography



Horticultural experience – Joan Wrench Intern

Garden planning and development



Maintenance, development and curation of living collection



Joan Wrench Internship continued..

Research and development



Micropropagation



Propagation trails (Pelargonium)



Tracking populations
Steirodiscus species

Joan Wrench Internship continued..

Key performance area - communication

The effects of cutting technique and auxins on the rooting of *Diosma haekraalensis*, an endangered buchu of the fynbos biome

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Faculty of Applied Science
Department of Horticultural Science ²



INTRODUCTION

Buchus are aromatic plants known for their essential oil producing abilities and its multiple healing properties. They are mostly confined to Cape Floristic Region in Southern Africa. According to the Red List of South African plants, *D. haekraalensis* is listed as Endangered (EN). This highly range-restricted species is currently threatened by competition from unmanaged alien invasive plant species and one location has been earmarked as a possible site for the development of a nuclear power plant. With the decrease in population numbers in the wild, ex-situ conservation needs to be considered where standard propagation protocols need to be developed. A standard vegetative propagation protocol is needed for the successful propagation of this endangered plant species to increase its rooting potential. The purpose of this study is to evaluate the effects of cutting techniques and level of auxins on the rooting percentage of *D. haekraalensis*.



Figure 1: Image showing *D. haekraalensis* plant

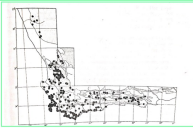


Figure 2: Distribution map of *D. haekraalensis*.



Figure 3: Image showing flower and leaf structure of *D. haekraalensis*.

PROBLEM STATEMENT

A common challenge in propagation of most buchu species is that seed propagation has proven to be difficult as a standard propagation method, as it is difficult to collect seeds in large quantities. Vegetative propagation has also proven to be a challenge.

There are limitations in seed availability and viability, combined with poor rooting of cuttings.

HYPOTHESIS

- It is hypothesized that the auxin-level will have varying effects on the rooting of cuttings of *D. haekraalensis*
- It is hypothesized that cutting technique will have an effect on the rooting of *D. haekraalensis* cuttings.

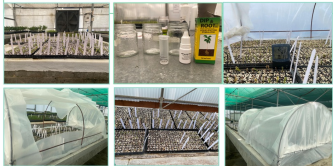
AIMS AND OBJECTIVES

- The aim of this study is to evaluate the effects of cutting technique and level of Auxins for rooting of *D. haekraalensis*, an endangered plant in the fynbos biome. To achieve this, the following objectives need to be completed:
- To investigate the most suitable cutting technique (focusing on heel and tip cutting) for maximum yield of roots proliferation.
 - To determine the concentration level of auxins (IBA and NAA) to optimize the rooting of *D. haekraalensis* cuttings.
 - To determine the effects of temperature and humidity on the rooting percentage of *D. haekraalensis* cuttings.

PROPOSED RESEARCH DESIGN AND METHODOLOGY

Materials and Methods

- For this study, a quantitative approach will be used to collect and analyse data based on the rooting of *D. haekraalensis* species to test effects of cutting technique (heel and tip), as well as the level of auxins.
- Plant material selected for this experiment will be on the basis of their uniformity in appearance, growth form and free from visual symptoms of pests and diseases.
- Healthy heel and tip cuttings of 40cm in size will be prepared using sterilized secateurs that have been dipped in Terminator and 70% ethanol. Polyethylene seedling trays will be used and sterilized using Terminator and 70% ethanol to remove any contamination that may affect the cuttings.
- Each treatment will have 10 cuttings and replicated 3 times. A polyethylene tray will be used which can accommodate 288 cuttings. All treatments will be represented in one tray and replicated 3 times. Cuttings will be monitored and data collected over a period of 6 weeks.



Images of experiment conducted 01/06/2023.

- A mini greenhouse structure will be developed and placed in the greenhouse to evaluate the effects of temperature and humidity on second experimental trials.
- Classical growth analysis will be conducted in this experiment based on the following measurements: Survival of cuttings (roots and shoots), average shoot length, average root length, average rooting percentage and average number of roots per cutting. Cuttings will be gently pulled, loosening the media to measure root length and rooting.

References

- Hypothesis, B., 1994. Buchu oil from the Heekraal's buchu, *Walden Flow*, p. 2.
Oliver, R., 2017. *PlantZAfrica*. [Online]. Available at: <http://www.plantzafrica.com/diosma-haekraalensis>
Kansen, P.A., 2003. Rooting of Buchu cuttings (Genus *Ageratum*). pp. 1-54. Available at: <http://redlist.sanbi.org/species.php?species=3554-37>

The following parameters will be tested

PRODUCT NAME	HORMONES	TYPE	CONCENTRATION	TECHNIQUE	TECHNIQUE
DIPARROT	IBA/NAA	LIQUID	CONC.1	TIP	HEEL
			CONC.2	TIP	HEEL
			CONC.3	TIP	HEEL
EISENBURG	IBA	LIQUID	CONC.1	TIP	HEEL
			CONC.2	TIP	HEEL
			CONC.3	TIP	HEEL
DYNAROOT/ SERAKIK	IBA	POWDER	CONC.1	TIP	HEEL
			CONC.2	TIP	HEEL
			CONC.3	TIP	HEEL
CONTROL	No hormone			TIP	HEEL

Expected outcomes, results and contributions of the research

- Plants produce natural auxins in young shoots and leaves however, synthetic auxins are needed to speed up and increase rooting percentages.
- The proposed study intends to improve the rooting of *D. haekraalensis* cuttings to evaluate and improve rooting of these endangered plant species at Kirstenbosch.
- These results will be recommended to Kirstenbosch and other growers as a standard propagation protocol for this endangered species.
- SPSS as well as Microsoft Excel will be used to analyse the data. An Analysis of Variance (ANOVA) will be done using SPSS to determine significant differences in the study. The data will be analysed using descriptive statistics and ANOVA. Graphs and tables will be used to interpret the results and findings.
- Results obtained from this study aims to be published in accredited journals and presented at local and international conferences.

Acknowledgments

I would like to thank my supervisors for their continuous support in the project. I would like to thank SANBI for funding my work as well as appreciate the opportunity to present this research project.



Kiosk and specimen stand – ID tests



Conference presentations

HEF Award

Goldfields



Steiroidiscus tagetes



PlantZAfrica published
articles
www.pza.sanbi.org.za



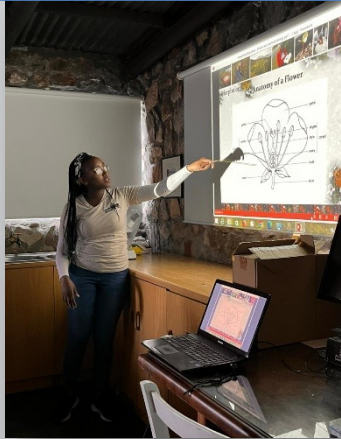
Acmadenia alternifolia



Pentzia incana

Joan Wrench Internship – Collaborations and field collection

MSB seed collection trips and projects



Brackenridgea project in Venda

Plant collection trips



Field methods on plant ecology – Kruger National Park



Content

- Woody plant biomass assessment
- Fire ecology
- Veld condition assessment
- Herbivory
- Plant functional traits
- Individual projects



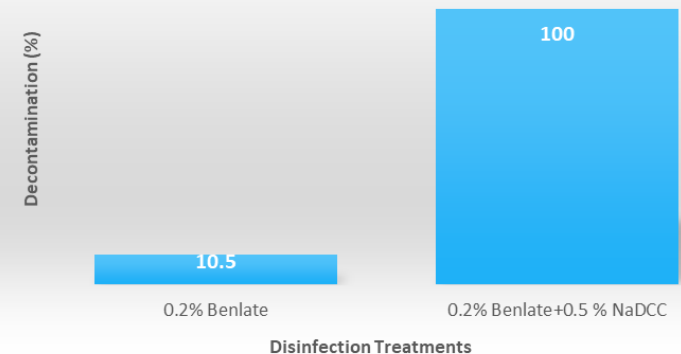
Plant propagation – Research projects

Strategies towards the development of a micropropagation protocol for *Gymnosporia woodii*, an endangered species from the KZN sandstone sourveld region

This study evaluated the initial micropropagation stages of *G. woodii*. The decontamination treatment of which the best survival and lowest contamination recorded (treatment 2) can be used to decontaminate explants for future research

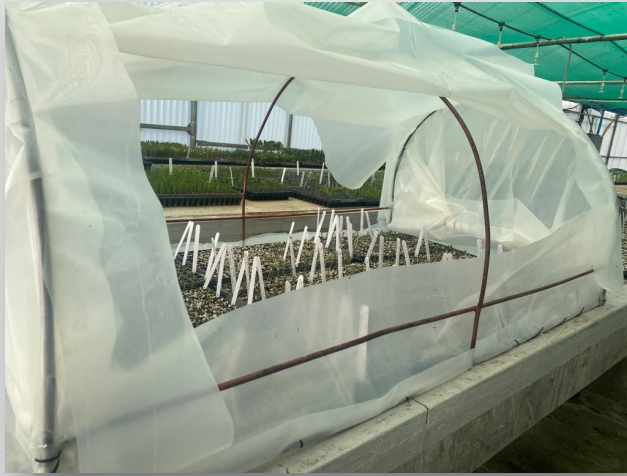


Level of contamination of each treatment



Plant propagation – Joan Wrench Research project

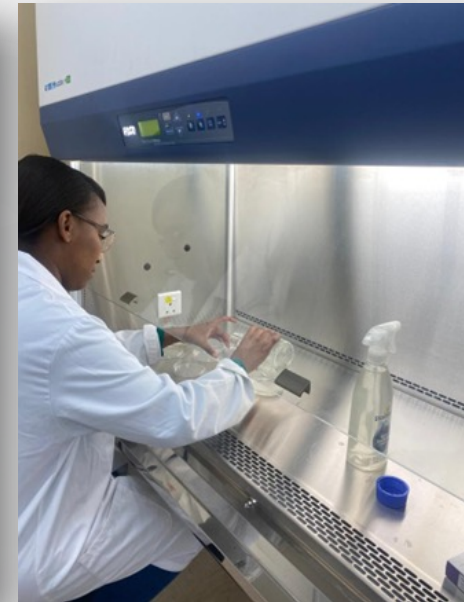
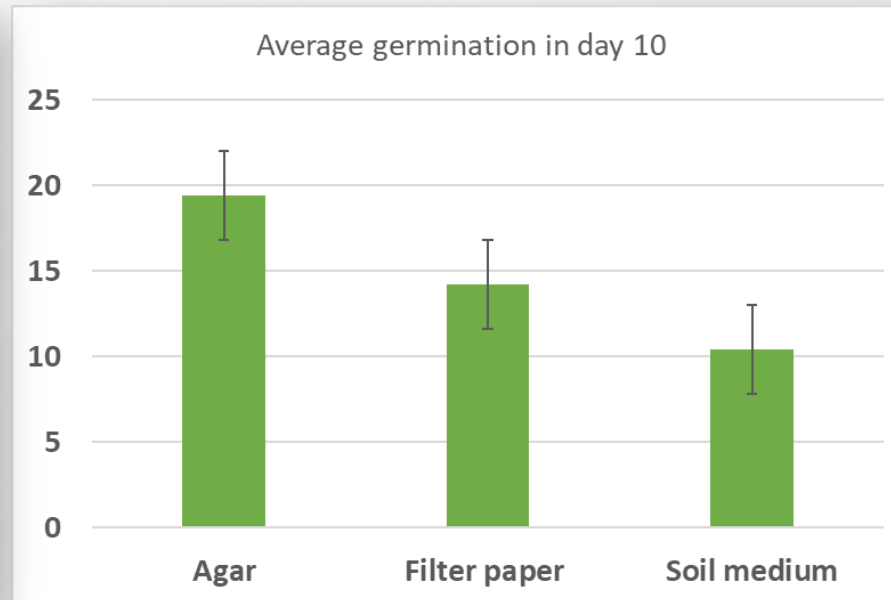
The effects of cutting technique and auxins on the rooting of *Diosma haelkraalensis*, an endangered buchu of the fynbos biome.



Plant propagation – Germination testing research project

Development of a seed germination protocol for a selected Asteraceae species stored at the MSB under controlled aseptic conditions.

- To develop a standardized germination protocol for turning these stored seeds into plants
- To establish optimal germination conditions and assess seed quality



Field of interests



* Horticultural science and research



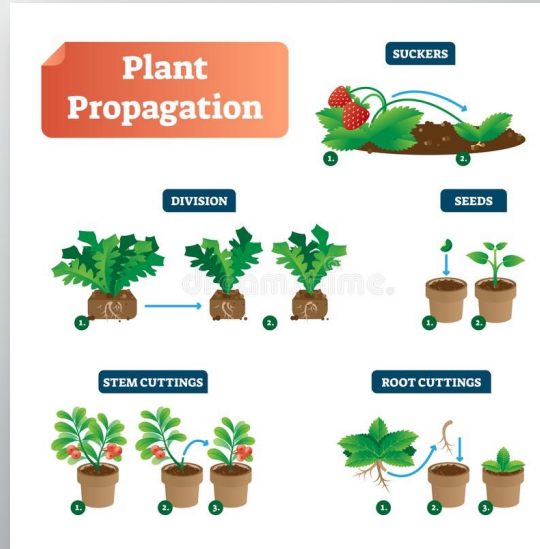
* Plant curation & Conservation



* Restoration



* Garden planning & development



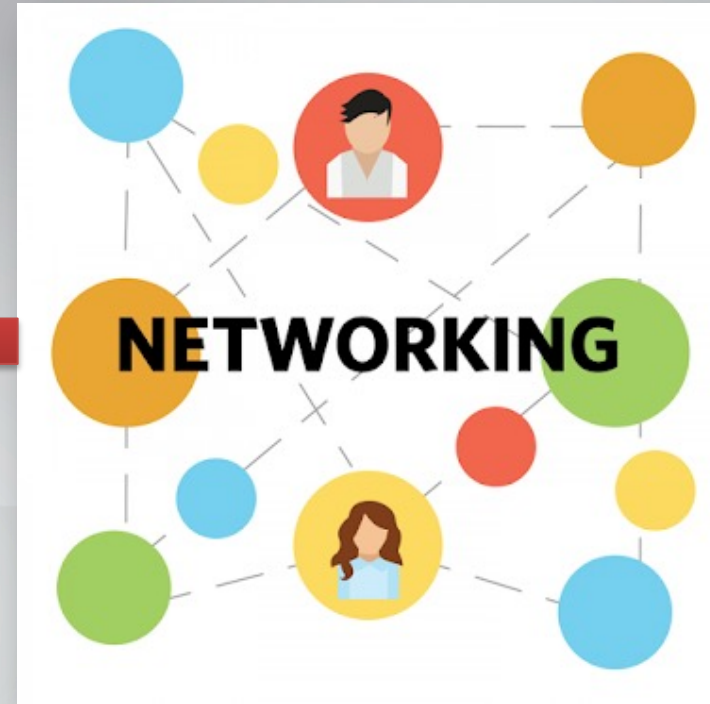
* Propagation techniques



* Fieldtrips/ Fieldwork

Why this opportunity for me?

To network with international professionals in plant production and Horticultural research, and implement what I have learned at IPPS South Africa



To learn about the various propagation techniques growers use and to identify trends in the horticultural industry at IPPS Australia and implement them to IPPS South Africa

Why this opportunity for me?



Banksia carlinoides

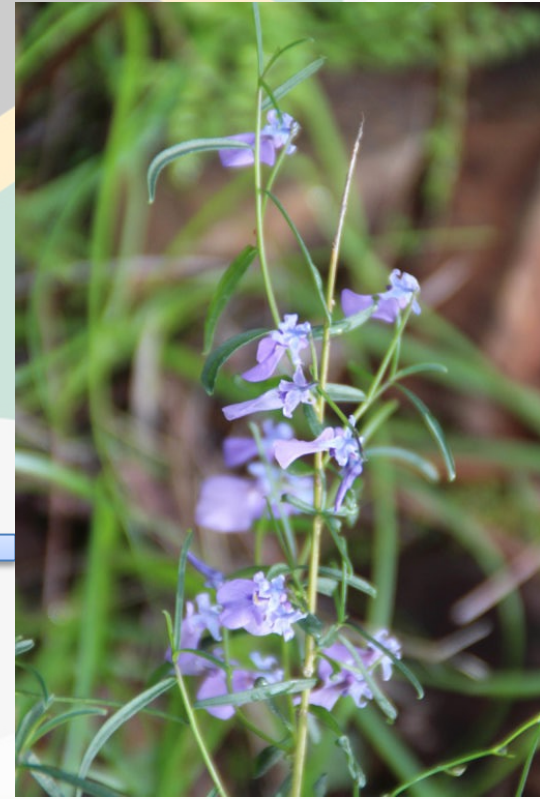


Protea comptonii

To explore similarities and differences in our flora and Australia

To explore conservation issues – endangered species in Australia

Hybanthus cymulosus



Why this opportunity for me?

Most importantly, to learn and have fun!!



Source: <https://www.thewildlifediaries.com/australian-animals>

Conclusion

- This opportunity will help me broaden my knowledge of Horticultural science
- I plan on learning as much as I can and using acquired knowledge in Australia to IPPS South Africa
- Gaining a long-lasting membership and network in my field.



Acknowledgments

- South African IPPS board
- South African National Biodiversity Institute (SANBI)
- Kirstenbosch NBGs staff and Horticulturists
- The Millennium Seed Bank and its staff
- The annual team as well as the nursery staff
- Roger Oliver
- Mpendulo Gabayi
- Fellow interns and students



Thank you 😊



Please vote for me