# Clonal Rootstock Budwood Storage Procedures for South African Propagation Conditions


Westfalia Technological Services

Marguerite Hyde

# Introduction

- 720 000 Avocado trees sold during the 2021-2022 season by 19 accredited Avocado Nurseries in South Africa:
  - 75% Clonal trees
  - 25% Seedling trees

- Different rootstocks and varieties sold during 2021-2022:
  - 56% Dusa, 19% Bounty and < 1% Duke 7
  - 76% Hass-type and 24% Greenskin cultivars

# Introduction

- The South African Westfalia Fruit Nursery produces 200 000 – 300 000 clonal trees per year.

- Availability of good quality rootstock budwood during the propagation season, limiting factors include:
  - Phenological growth cycle of the avocado mother trees
  - Seasonal changes
  - Varying horticultural practices
  - Readiness and seasonality of nurse seedlings

# Aim

- To investigate the effectiveness of different long-term storage protocols on the end quality of the budwood.

# Methods

- Two storage periods: 4 and 8 weeks
- Five different storage treatments (packaging)
- 10 Treatments in total
- A treatment was considered successful if it resulted in a successful graft union, as well as a healthy etiolated shoot of at least 45 cm after continuing with the clonal propagation process.

# Different Treatments

| Treatment no. | Treatment name | Storage period (weeks) | Coverage and packaging |
|---|---|---|---|
| 1 | NP-BB-4 | 4 | Dry newspapers inside a (black) refuse bag. |
| 2 | NP-BB-8 | 8 | Dry newspapers inside a (black) refuse bag. |
| 3 | NC-CP-4 | 4 | Dry baby nappy cloth inside a 50-micron clear plastic bag. |
| 4 | NC-CP-8 | 8 | Dry baby nappy cloth inside a 50-micron clear plastic bag. |
| 5 | PF-PCB-4 | 4 | Wrapped with parafilm and in a polystyrene chilly bin. |
| 6 | PF-PCB-8 | 8 | Wrapped with parafilm and in a polystyrene chilly bin. |
| 7 | XB-S-4 | 4 | Xtend Bulk packaging (Stepac). |
| 8 | XB-S-8 | 8 | Xtend Bulk packaging (Stepac). |
| 9 | CP-4 | 4 | 50-Micron clear plastic bag. |
| 10 | CP-8 | 8 | 50-Micron clear plastic bag. |

# Different Treatments


T1 (NP-BB-4) and T2 (NP-BB-8)


T3 (NC-CP-4) and T4 (NC-CP-8)


T5 (PF-PCB-4) and T6 (PF-PCB-8)


T7 (XB-S-4) and T8 (XB-S-8)


T9 (CP-4) and T10 (CP-8)

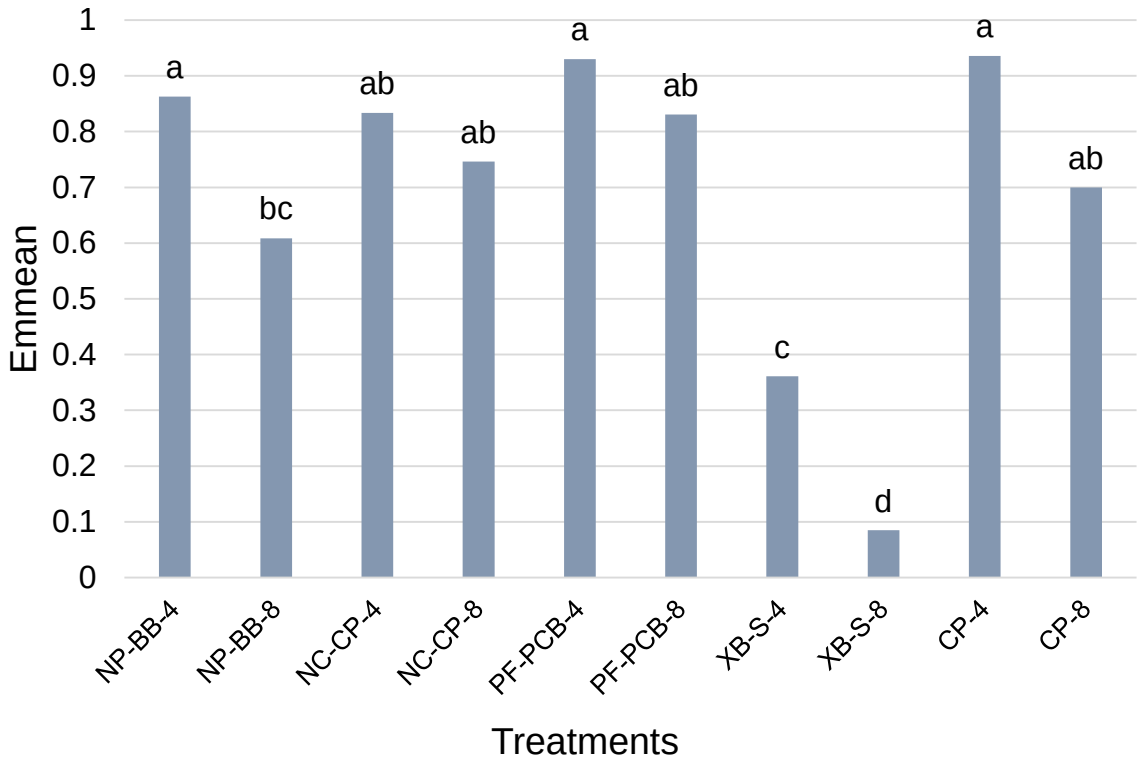
# Methods

- Step-down temperature regime:
  - Day 1: 15°C
  - Day 2: 10°C
  - Day 3: 8°C
- Treatments PF-PCB-4 and PF-PCB-8: the chilly bin left open to reach the desired 8°C inside, before closing.

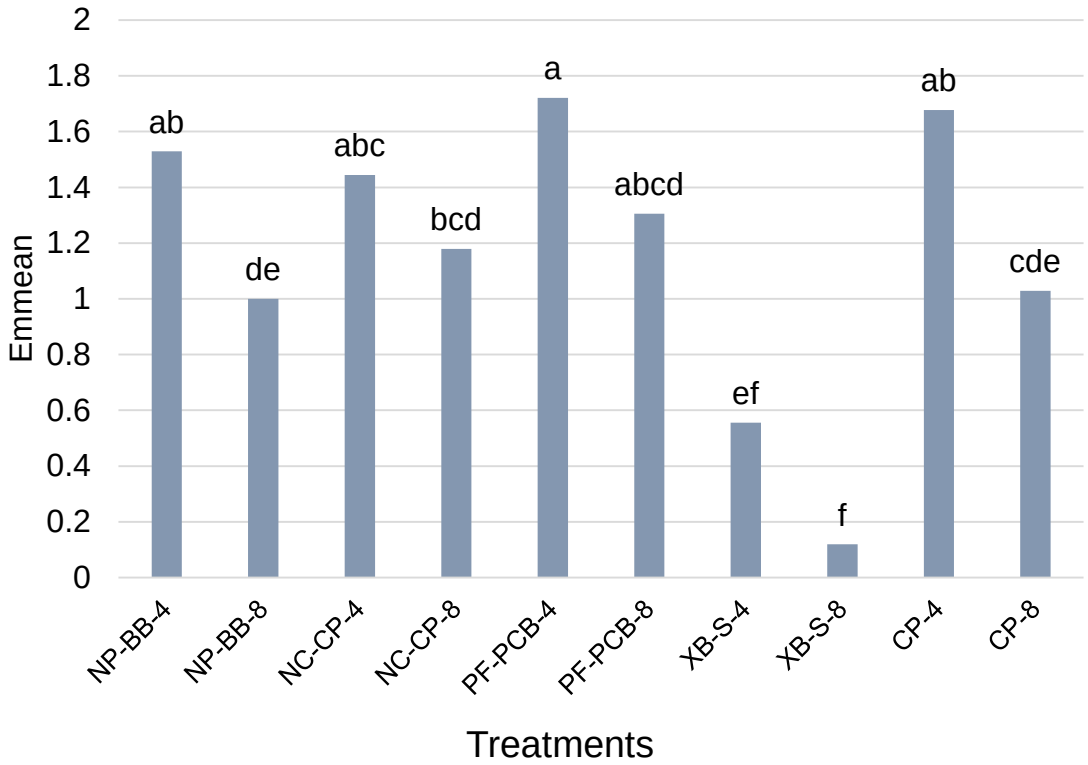
| Trait | Name in analysis |
|---|---|
| Before Etiolation Rating | BER |
| Graft Success During Etiolation | GSDE |
| Successful Plant | SP |

# BER and GSDE Results

## The Before Etiolation Rating and the Graft Success During Etiolation results:




0 = Unsuccessful (broken/dead/rosette-like bud)
1 = Successful graft

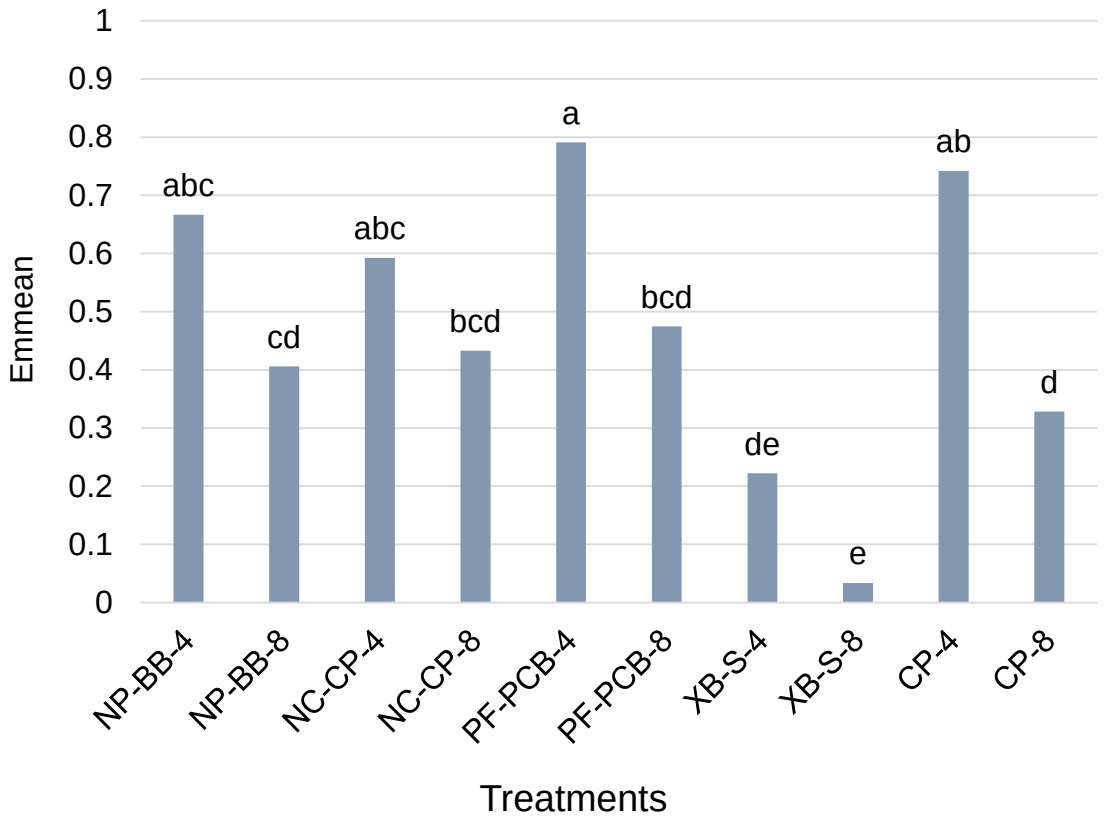



0 = Failed before etiolation
1 = Stunted rosette-like bud
2 = Successful graft

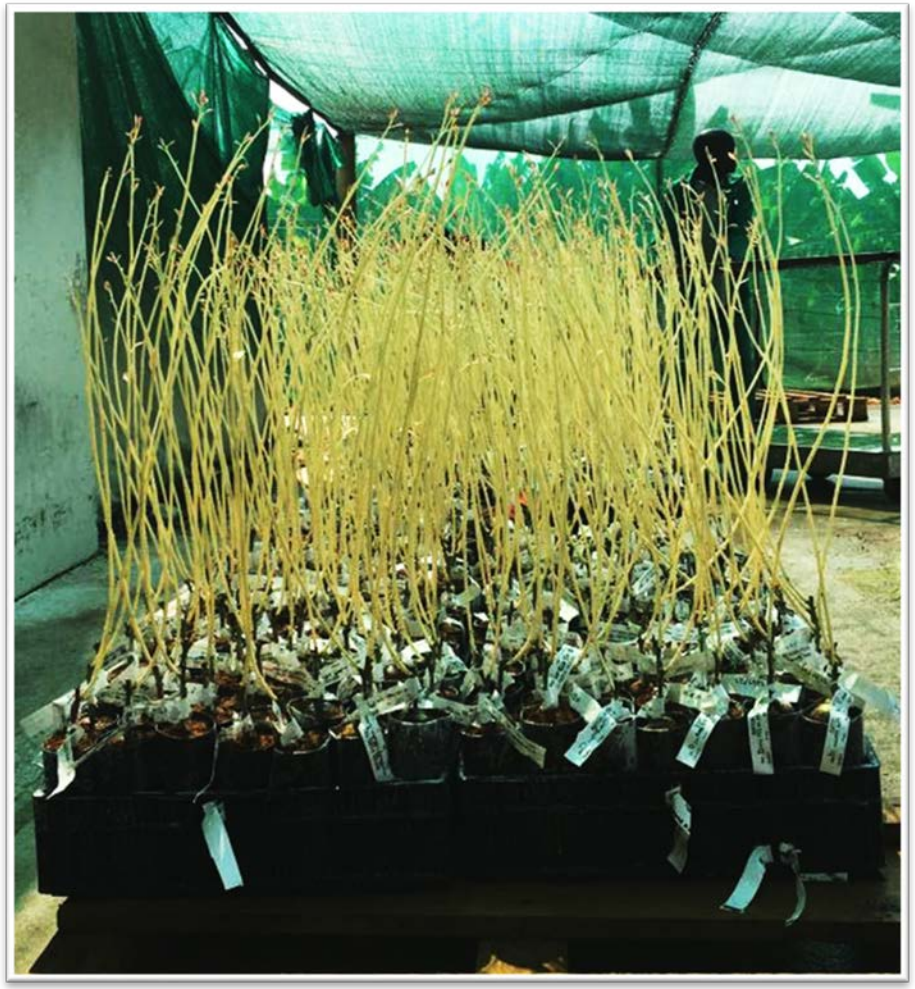
# BER and GSDE Results


Failed grafts are described as shriveled material or buds, some might have swollen but resulted in a stunted rosette-like bud.

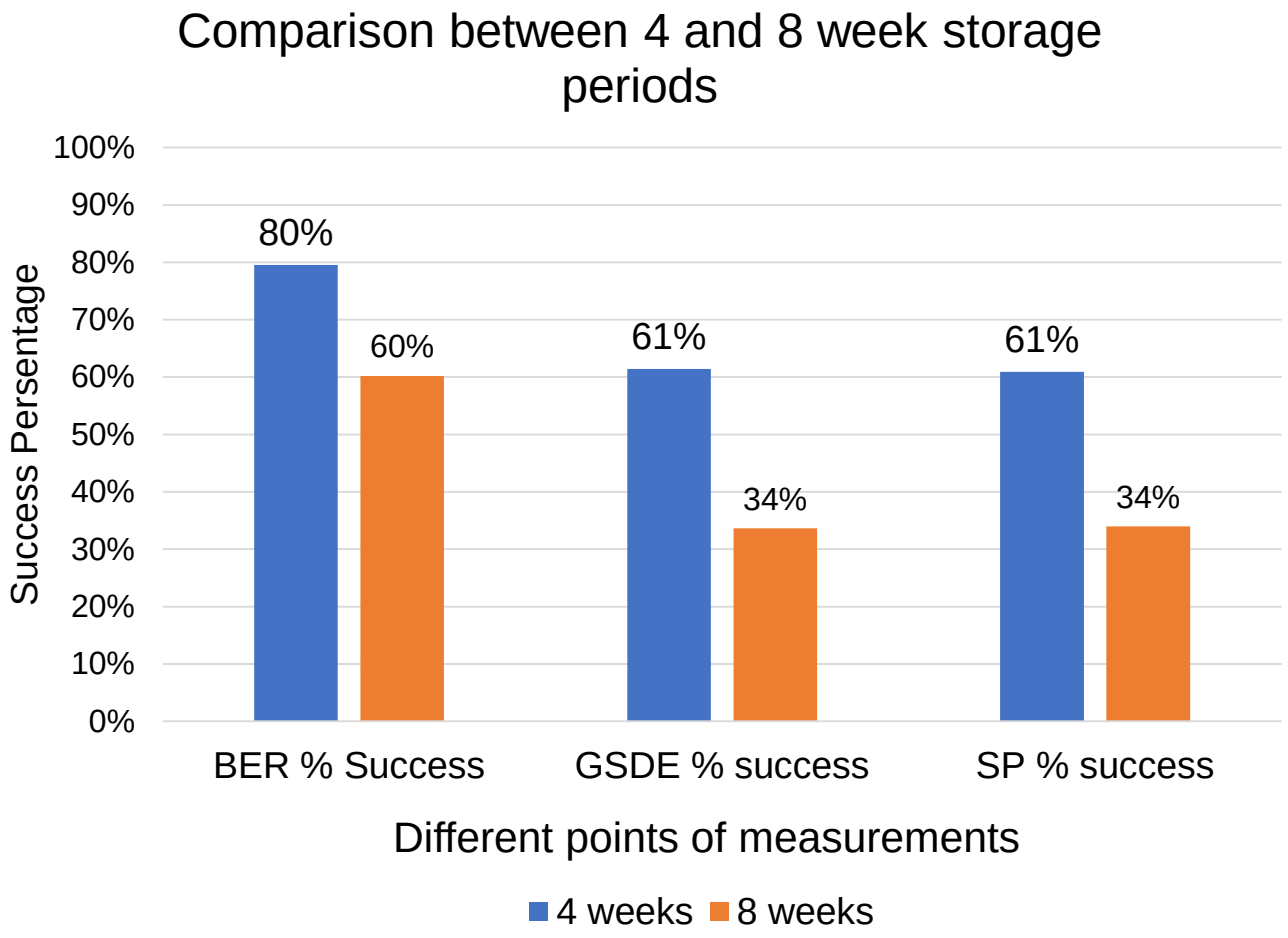
# Successful Plants Results




0 = Unsuccessful plant (failed during etiolation)
1 = Successful plant



# Storage period comparison and correlations




| | EMM_BER | EMM_GSDE | EMM_SP |
|---|---|---|---|
| EMM_BER | 1 | | |
| EMM_GSDE | 0,985 | 1 | |
| EMM_SP | 0,930 | 0,979 | 1 |

# Discussion

- Number of repetitions between treatments not equal, but statistically acceptable (> 30 units).
- All stored material was grafted, even when the quality was questionable.
- Similar number of plants sorted to etiolation was expected as successful plants at the end of the project.
- Greater success with a 4-week storage period when compared to an 8-week storage period.
- Polystyrene chilly bin left open to adjust to storage temperature before being closed, confirmed to be beneficial.

# Conclusion

Parafilm-wrapped budwood stored inside the polystyrene chilly bin and the control treatment (50-micron clear plastic bag) over a 4-week storage period was considered successful.

Repeat the trial with fewer treatments over a longer period to monitor the effect of the phenological growth cycle on propagation success.

# Acknowledgements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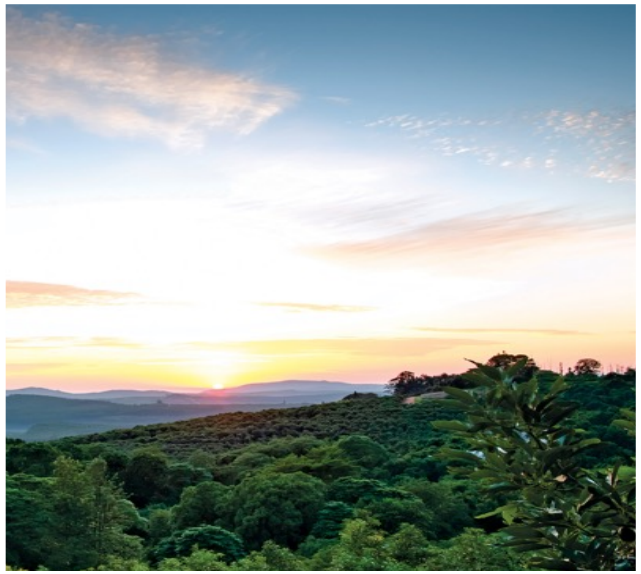
# THANK YOU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