

Biological control of *Cereus jamacaru* (queen of the night cactus) in the Thornveld of the Limpopo Province, South Africa

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Introduction

- *Cereus jamacaru* has been a problem plant in South Africa over decades, and since then it has been listed in the Conservation of Agricultural Resources Act (Act 43/1993), as a Category I invader
- It has invaded large parts of Limpopo, especially areas with high clay content soils in the southern parts of the province



Problem Statement

1. The plant invades the area and results in:
 - disappearance of natural vegetation; and
 - degeneration of rangelands.
2. Category I invader species
 - Can not propagate/transport/conserve
 - Forced by law (CARA) to destroy.
3. Current chemical control is toxic (MSMA)
 - Expensive
 - Labour intensive



Aim

- The main aim of the study was to evaluate the effectiveness of biological control on *C.jamacaru* with the *Hypogeococcus pungens* (mealybug) in the Limpopo Province



Biological control agents

- Two insect species from Argentina & Paraguay were introduced for the control of harassia cactus (*Harassia martini*) namely:
 - Harassia cactus mealybug, *Hypogeococcus pungens*, and
 - Stem-boring cerambycid beetle, *Alcidion cereicola*
- These insect species also attack *C. jamacaru*
 - *Harrisia* cactus mealybug was used as a biological agent for this study



Methodology

TRIAL SITE

- Location: The Towoomba ADC (Bela Bela ; 28°21'E, 24°25'S; 1 184 m a.s.l.).
- Long-term annual summer rainfall: 630 mm.
- Long-term daily average maximum and minimum temperatures: 30.2°C and 17.6°C (December); 21.0°C and 3.0°C (July).
- Vegetation types: Sourish Mixed Bushveld/Turf Thornveld.
- Dominant trees: *Dichrostachys cinerea* and *Acacia* spp.
- Dominant grasses: *Eragrostis* spp., *Enneapogon scoparius*, *Panicum maximum*, *Themeda triandra* and *Heteropogon contortus*.
- Soil types: Hutton (red turf) & Arcadia (Black turf).

...Methodology

- Sixty *C. jamaclaru* plants of various heights and age were randomly selected
 - Thirty plants were treated with harrisia cactus mealybug during October 2008.
 - Thirty were left untreated.
- During April 2012, plants were surveyed to determine the effectiveness of the treatment.

Treating *C. jamaclaru*

- Cuttings from infected plants were used
- Placed as near to young growth points as possible – insects have limited mobility.
- Out of direct sunlight.
- Rain negates successful early infestation.
- Herbicides were not applied to infected plants.



Data Collection

- Data was collected on:
 - Number of plants infected vs. number of plants untreated
 - Number of fruit & flowers produced
 - Plant height (m)
 - Distance to nearest uninfected plant

Results

	Untreated plants	Treated plants
Number of stems plant ⁻¹	2 (1; 6)	1 (1; 6)
Number of growth points plant ⁻¹	3 (1; 13)	6 (1; 24)
Number of stems treated plant ⁻¹	0	1
Number of growth points plant ⁻¹ infected	0 (0; 2)	6 (1; 24)
Number of flowers plant ⁻¹	0 (0; 3)	0
Number of fruits plant ⁻¹	3 (0; 15)	0 (0; 2)
Estimated plant height (m)	2.0 (0.5; 6.0)	3.0 (0.8; 9.0)
Number of plants killed	0	0
Distance to the nearest uninfected plant (m)		5.0 (0.5; 24.0)

(Averages/30 plants)

*Numbers in brackets represent minimum and maximum values

Discussion

- No mortalities occurred (small plants were expected to be killed).
- Infection was effective (1 stem treated, all growth points were infected on treated plants). Flower and fruit production were retarded (stunted and disfigured growth).
- Only two growth points were mildly infected at untreated plants
- **Problem:** Almost no spreading of insects between plants (even up to a distance of 0.5 m - females cannot fly).

Untreated plants vs Treated



Untreated.....

Position of infection.....

The effect of the Harrisia mealybug



Appearance of infected plants...

The effect ...

Conclusions

- The treatment was partially effective – the insects didn't kill plants (?), but stop their spreading (reproduction).
- Costs – cheaper than applying herbicides, although each plant must be individually treated.
- More eco-friendly.

Thank You!

