



**One Health**  
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# Host response of cancer bush (*Sutherlandia frutescens*) to *Meloidogyne enterolobii*

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# Introduction

- Cancer bush (*Sutherlandia frutescens*) is an indigenous medicinal plant with extensive medicinal properties and pharmacological application (Masenya *et al.*, 2020).
- It's demand is rising in South Africa and globally due to its medicinal properties and the growing interest in plant-based remedies.
- Climate change has introduced new pests, like nematodes, which threaten its cultivation.
- There is a need for evaluation of more PPNs such as *Meloidogyne enterolobii* in the production of cancer bush.
- The objective of the study was to establish the host status and host sensitivity of *S. frutescens* to *M. enterolobii*



Figure 1: Cancer bush plant



# Materials and methods

## Description of the study site

- The study was conducted at the University of Mpumalanga university farm (25° 25′ 27″ S 30° 58′ 21″ E), , Nelspruit, South Africa under microplot and shade net conditions during Summer (2023) and winter (2024).
- The area is exposed to less than 500mm of annual rainfall and an average temperature of 10°C minimum and 38°C of maximum.



# Materials and methods

## Experimental Design



**Figure 2:** Microplot



**Figure 4:** Shade net



# Materials and Methods

## Preparation of plant material and inoculum

- Stem pasteurized sand and loam soil (300 °C for one hour) in a 3:1 (v/v) ratio.
- Pots were spaced at 15 cm x 15 cm inter-row and intra-row spacing.
- Seeds were directly planted and thinned after 2 weeks of emergence.
- Seedling inoculated using a 20ml syringe.
- Eight treatments of 0, 25, 50, 125, 250, 625, 1250, and 3125 *M. enterolobii* eggs and J2, with seven replications.
- Irrigated with 250 ml of tap water per plant.
- Inspection of insects and pests.



# Materials and Methods

## Data collection and analysis

- Plant growth variables were measured at 56 days after inoculation.
- Nematodes were extracted from the roots and soil.
- The plant growth variable and nematode data were subjected to analyses of variance (ANOVA), through Statistix10 software.
- Shapiro-Wilk normality test was used to test for deviation from normality in each standardized residuals variable (Gomez and Gomez, 1984).
- Fisher's Least Significant Difference Test ( $P \leq 0.05$ ) was used to achieve the mean separation.
- To minimize variation amongst variables the data was transformed using  $\log_{10}(x+1)$  transformation



## Results and discussions

Table 1: Response of nematode treatments, galling index (GI) final nematode population density (Pf) and reproductive factor (RF) of Cancer bush with *Meloidogyne enterolobii* under 2 different conditions during summer

Treatment	GI	PF		RF	PF
		Microplot	Shade net		
25	0.61 <sup>a</sup> (3.29)	3.11 <sup>ab</sup> (2114.4)	1.72 <sup>a</sup> (84.57)	1.36 <sup>bc</sup> (157.14)	
50	0.63 <sup>a</sup> (3.29)	3.12 <sup>ab</sup> (2273.4)	1.45 <sup>a</sup> (45.47)	1.11 <sup>cd</sup> (200)	
125	0.56 <sup>ab</sup> (2.71)	2.79 <sup>b</sup> (1285.7)	0.82 <sup>b</sup> (10.29)	1.81 <sup>bc</sup> (1028.6)	
250	0.48 <sup>ab</sup> (2.29)	2.71 <sup>b</sup> (814.29)	0.53 <sup>bc</sup> (3.26)	2.00 <sup>bc</sup> (971.43)	
625	0.51 <sup>ab</sup> (2.57)	2.86 <sup>ab</sup> (1471.4)	0.41 <sup>c</sup> (2.35)	1.80 <sup>bc</sup> (442.86)	
1250	0.43 <sup>b</sup> (2.14)	2.69 <sup>b</sup> (714.29)	0.17 <sup>cd</sup> (0.57)	3.45 <sup>a</sup> (4657.1)	
1325	0.58 <sup>ab</sup> (2.86)	3.32 <sup>a</sup> (2885.7)	0.25 <sup>cd</sup> (0.92)	2.64 <sup>ab</sup> (2914.3)	



## Results and discussions

Table 2: Response of nematode treatments, galling index (GI) final nematode population density (Pf) and reproductive factor (RF) of Cancer bush with *Meloidogyne enterolobii* under 2 different conditions during winter

Treatment	GI	Microplot		Shade net	
		PF	RF	PF	RF
25	0.38 <sup>a</sup> (1.57)	2.84 <sup>b</sup> (714.29)	1.46 <sup>a</sup> (28.57)	2.35 <sup>b</sup> (285.71)	1.01 <sup>a</sup> (11.43)
50	0.35 <sup>a</sup> (1.29)	2.95 <sup>ab</sup> (971.43)	1.28 <sup>b</sup> (19.43)	1.76 <sup>c</sup> (214.29)	0.60 <sup>b</sup> (4.29)
125	0.48 <sup>a</sup> (2.14)	2.87 <sup>b</sup> (785.71)	0.84 <sup>c</sup> (6.29)	2.50 <sup>ab</sup> (328.57)	0.55 <sup>b</sup> (2.63)
250	0.44 <sup>a</sup> (1.86)	2.88 <sup>b</sup> (814.29)	0.61 <sup>d</sup> (3.26)	2.48 <sup>ab</sup> (314.29)	0.35 <sup>c</sup> (1.26)
625	0.42 <sup>a</sup> (1.71)	2.94 <sup>ab</sup> (885.71)	0.38 <sup>e</sup> (1.42)	2.54 <sup>ab</sup> (357.14)	0.19 <sup>cd</sup> (0.57)
1250	0.42 <sup>a</sup> (1.71)	3.00 <sup>ab</sup> (1100)	0.26 <sup>e</sup> (0.90)	2.60 <sup>ab</sup> (442.86)	0.12 <sup>de</sup> (0.35)
1325	0.35 <sup>a</sup> (1.43)	3.04 <sup>a</sup> (1142.9)	0.13 <sup>f</sup> (0.37)	2.84 <sup>a</sup> (714.29)	0.09 <sup>de</sup> (0.23)





## Results and discussions

Table 3. The interactive effect of the treatments and growing condition on final population (PF) and reproductive factor (RF)

Treatments	Growing Condition	PF	RF
25	Microplot	2.9758 <sup>a</sup>	0.4103 <sup>a</sup>
50	Microplot	3.0332 <sup>a</sup>	0.3675 <sup>a</sup>
125	Microplot	2.8331 <sup>a</sup>	0.2565 <sup>b</sup>
250	Microplot	2.7948 <sup>a</sup>	0.1910 <sup>cd</sup>
625	Microplot	2.9025 <sup>a</sup>	0.1406 <sup>def</sup>
1250	Microplot	2.8464 <sup>a</sup>	0.0840 <sup>fgh</sup>
3125	Microplot	3.1800 <sup>a</sup>	0.0736 <sup>gh</sup>
25	Shade net	1.8464 <sup>cd</sup>	0.2365 <sup>bc</sup>
50	Shade net	1.4342 <sup>d</sup>	0.1552 <sup>de</sup>
125	Shade net	2.1605 <sup>c</sup>	0.1656 <sup>de</sup>
250	Shade net	2.2389 <sup>bc</sup>	0.1343 <sup>def</sup>
625	Shade net	2.1670 <sup>c</sup>	0.0709 <sup>gh</sup>
1250	Shade net	3.0269 <sup>a</sup>	0.1217 <sup>efg</sup>
3125	Shade net	2.7420 <sup>ab</sup>	0.0554 <sup>hi</sup>



## Conclusions and recommendations

- Cancer bush is tolerant to *M. enterolobii* and the nematodes had the highest population under microplot conditions in both seasons.
- It is recommended to cultivate it under shade net condition as the plants experience less stress in such environments.



# References

Gomez, K.A., 1984. Statistical procedures for agricultural research. *John New York: Wiley and Sons.*

Masenya, T.A., Pofu, K.M. and Mashela, P.W., 2020. Responses of cancer bush (*Sutherlandia frutescens*) and *Meloidogyne javanica* to increasing concentration of Nemafric-BL phytonematicide. *Research on Crops*, 21:3.

# Thank you for your attention!

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