

# *Seriphium plumosum* L encroachment is influenced by abiotic factors and variation in grassland community composition

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# Background

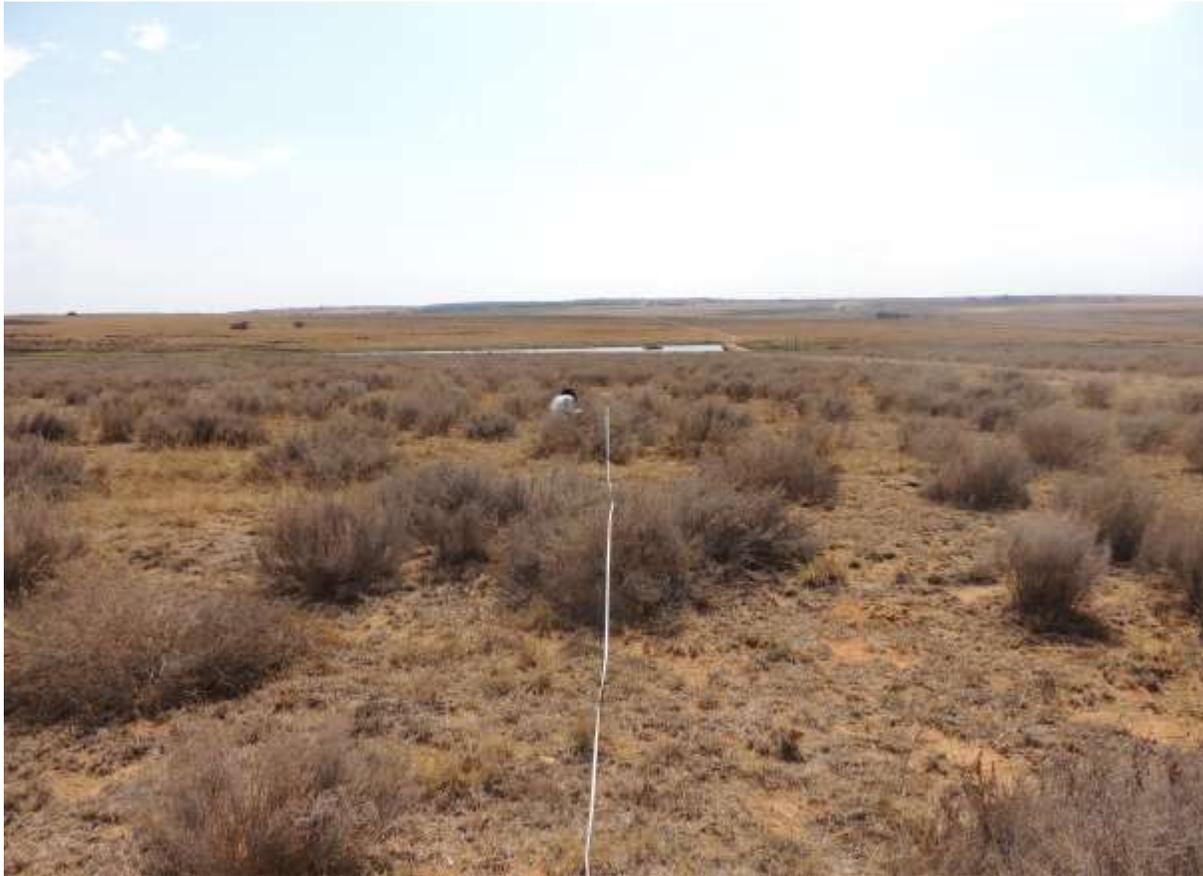


Causes and consequences of woody plant encroachment are complex because factors underlying them vary spatially and temporally.



# Causes

Overgrazing



Fire suppression



## Herbivore suppression



## Global climate change



# Consequences

Decreased grass cover and soil pH



Increase in soil carbon and nitrogen  
pool



Attributes remain unchanged



Causes and effects of woody plant encroachment on ecosystem functioning are limited in extent and confined largely to pastoral land uses or particular geographical regions.



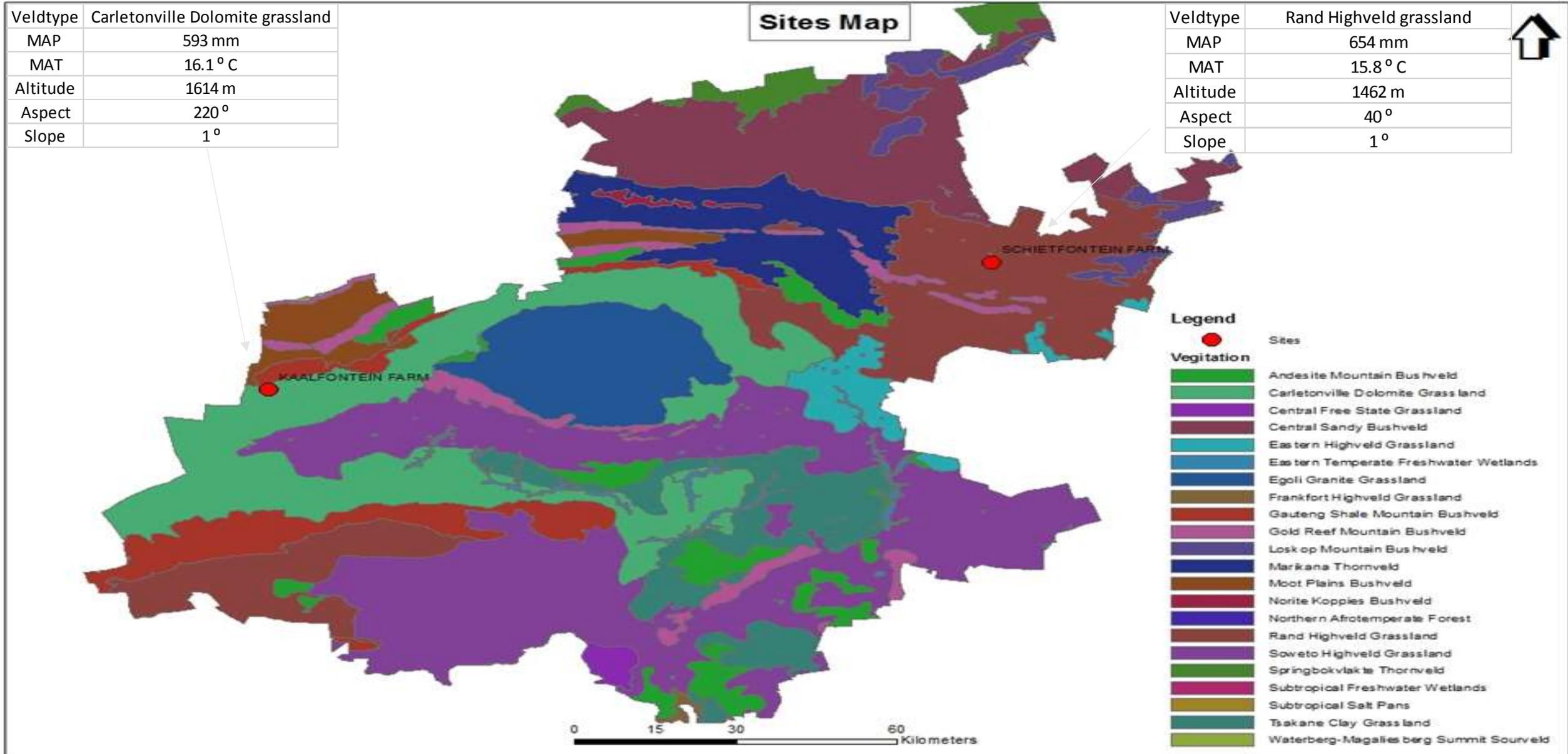
# Aim

To use *S. plumosum* encroached rangelands to test the hypothesis that woody plant encroachment decreases ecosystem functioning, particularly for soil nutrient resources.

# Objectives

- To survey *S. plumosum* density from two grassland communities in relation to abiotic factors such as topographic position (top, mid and bottom), soil texture (sand, silt and clay) and soil fertility (organic C, Phosphorus, Potassium, and Total Nitrogen).

# Materials and methods



# Experimental design

	Plot			
	1	2	3	4
Rep				
1	B	D	C	A
2	D	B	A	C
3	A	C	B	D

The experiment was a complete randomized design (CRD), with two plots, each of 625m<sup>2</sup>, latinized in each of the three slope (i.e. top slope, mid slope and bottom slope) position and replicated six times in each of the two grassland communities

# Materials and methods continue...

- *Seriphium plumosum* density
- Soil samples
  - ✓ texture
  - ✓ Fertility
  - ✓ pH

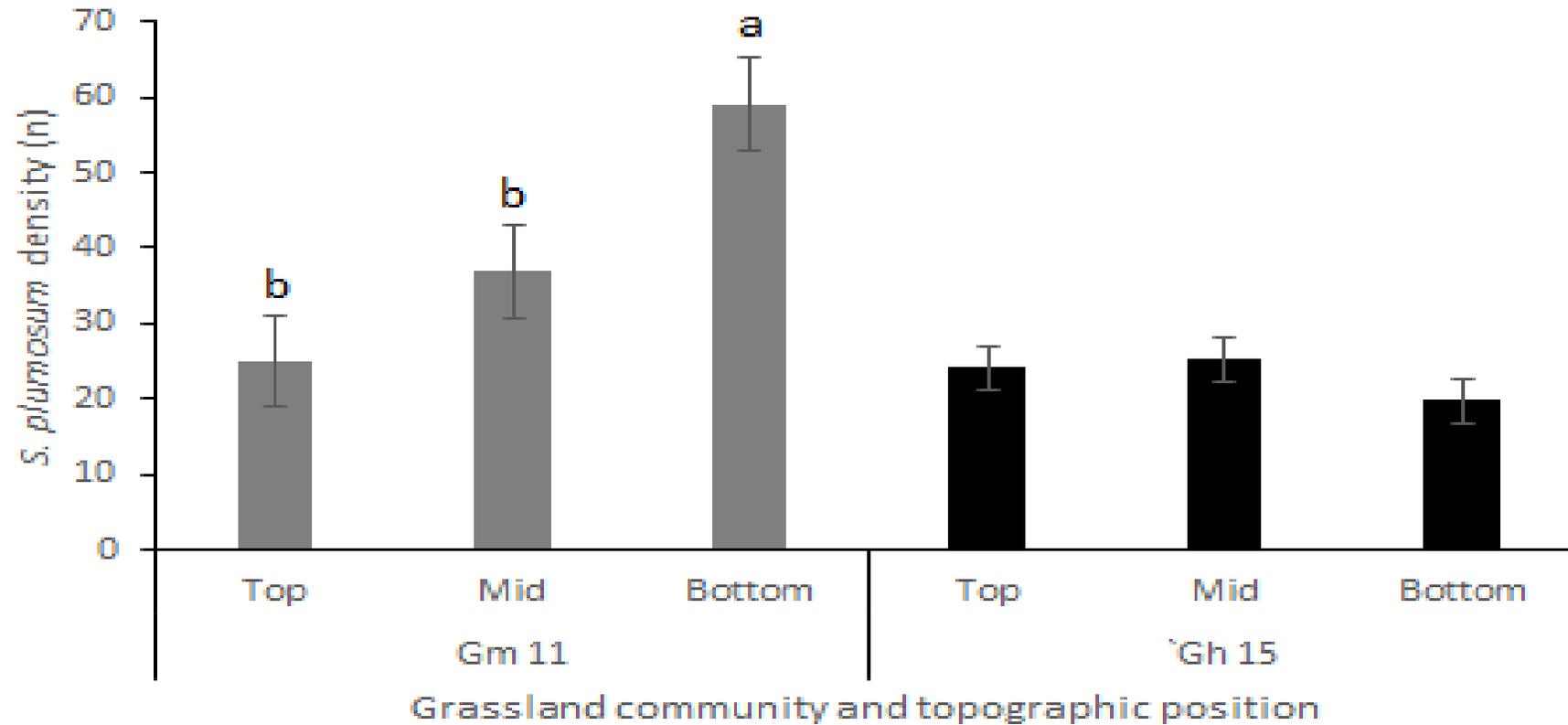


# Data analysis

	Plot			
	1	2	3	4
Rep				
1	B	D	C	A
2	D	B	A	C
3	A	C	B	D

- A complete randomised design with a 2 x 3 factorial analysis of variance (ANOVA) using the GLM procedures.
- Model included a fixed effect of grassland community, topographic position and their interactions
- Correlation analysis was performed between *S. plumosum* and soil parameters

# Results and discussions



Rand Highveld grassland (Gm11)

Carletonville Dolomite grassland (Gh 15)

# Results and discussion continue. . .

*Seriphium plumosum* density was inversely correlated with;

- Organic C ( $r = -0.2710$ ;  $P = 0.0208$ )
- Phosphorus ( $r = -0.2852$ ;  $P = 0.0152$ )
- Potassium ( $r = -0.2912$ ;  $P = 0.0131$ )

# Conclusion

- The results suggest that causes and consequences of *S. plumosum* encroachment in various grassland communities are not universal.
- May further suggest that combination of different factors contribute to *S. plumosum* encroachment
- More research work is needed on other grassland communities to better understand *S. plumosum* encroachment and its drivers.

# Acknowledgements



Thank you  
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