

Do termites enhance the invasion of southern African savannas by alien plants?

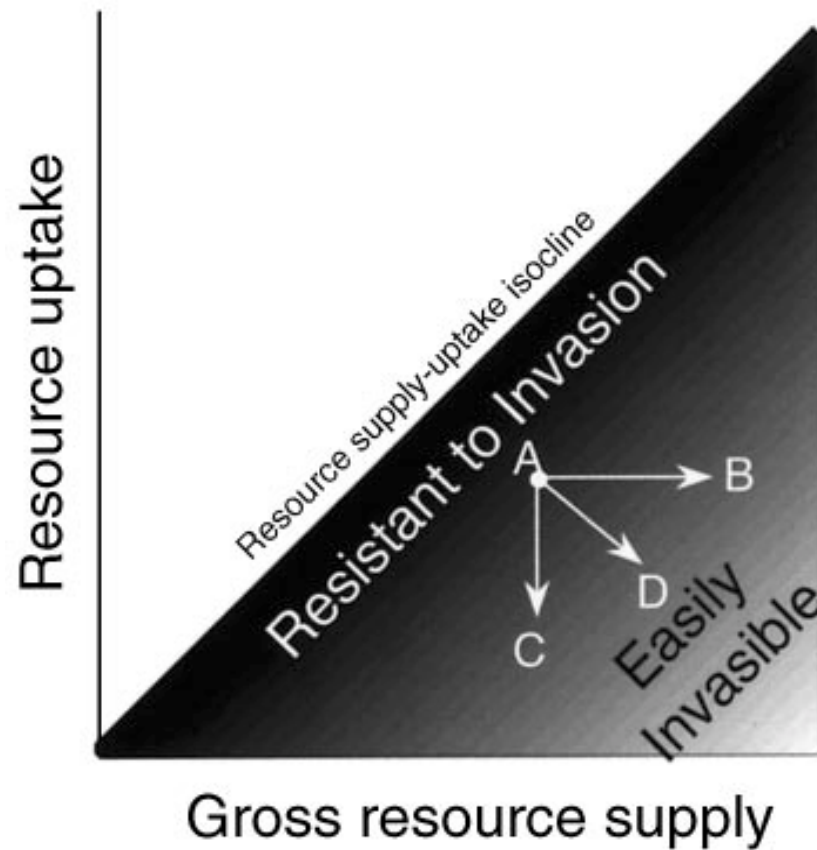


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A plant community becomes more prone to alien plant invasions if the amount of unused resources increases



Davis, M.A., Grime, J.P., & Thompson, K. 2000. *Journal of Ecology*, **88**, 528-534.



Our hypothesis: termites increase the availability of environmental resources and this drives alien plant invasions

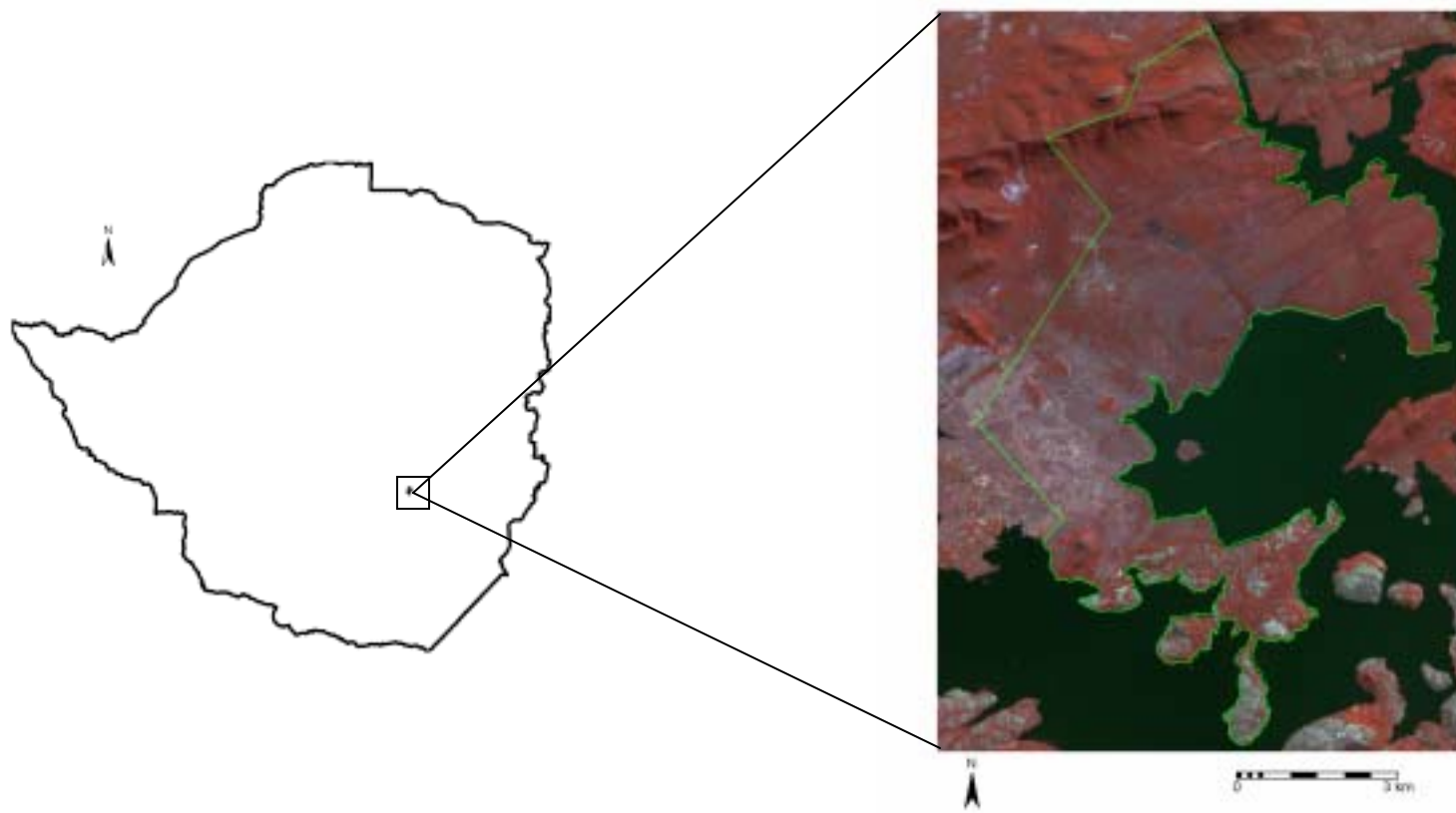


- Mean diameter = 19.06 m (± 1.41 s.e., n = 48)

Macrotermes natalensis (Haviland)



The study area (Kyle Game reserve) is located in southern Zimbabwe



- 20° 13' South, 31° 03' East
- 800 mm mean annual rainfall
- 1020 m – 1480 m a.s.l.

Photographs of two alien plant invaders studied: 'all that glitters is not gold'



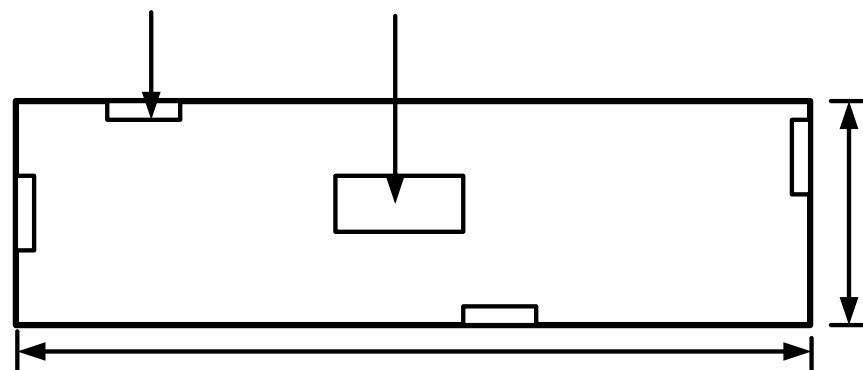
Lantana camara (Cheerie-pie)



Duranta erecta (Forget-me-not/Golden dewdrop)



Field measurements were done to show that fertility and the abundance of aliens are higher at mounds than non-mounds



Layout of an intensive vegetation plot

Variables measured:

- Vegetation composition and percentage cover
- Mineral N, available P, K, Ca, Mg, and pH
- The spatial location of mounds and alien plant invaders



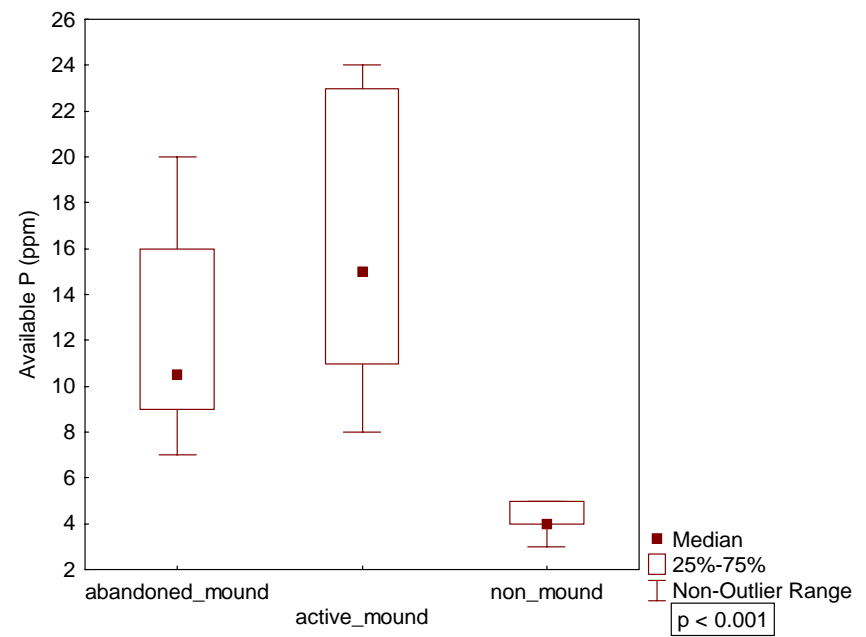
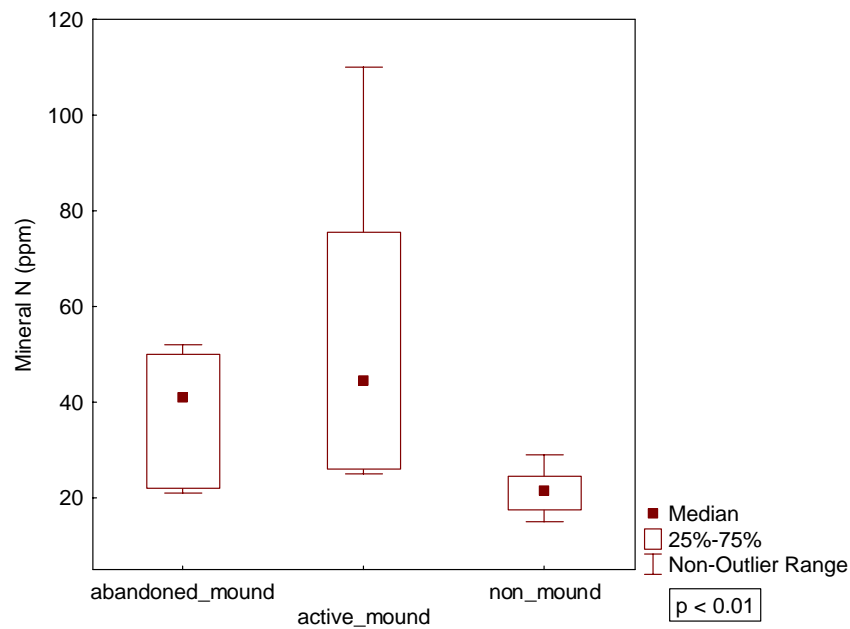
A greenhouse experiment was done to show that alien plants perform better at mounds than non-mounds

ABL	NML	NMD	NMD	AML	AML	AML	NML	AMD	ABL	NMD	AML	AML	NML	ABD	ABD	AML	AML	NMD	ABL
NML	AML	NMD	ABD	ABD	ABL	AMD	NML	NML	AMD	NMD	AMD	ABD	NML	AMD	ABD	ABL	ABD	NMD	ABD
NML	ABD	AMD	ABD	AML	AML	ABL	NML	AMD	AMD	NMD	NML	AMD	AMD	ABL	NMD	ABL	ABL	ABL	ABL

- *L. camara* and *D. erecta* were grown separately in pots filled with soils gathered from 10 active mounds, 10 abandoned/old mounds and 10 non-mound sites
- Each treatment was replicated 10 times

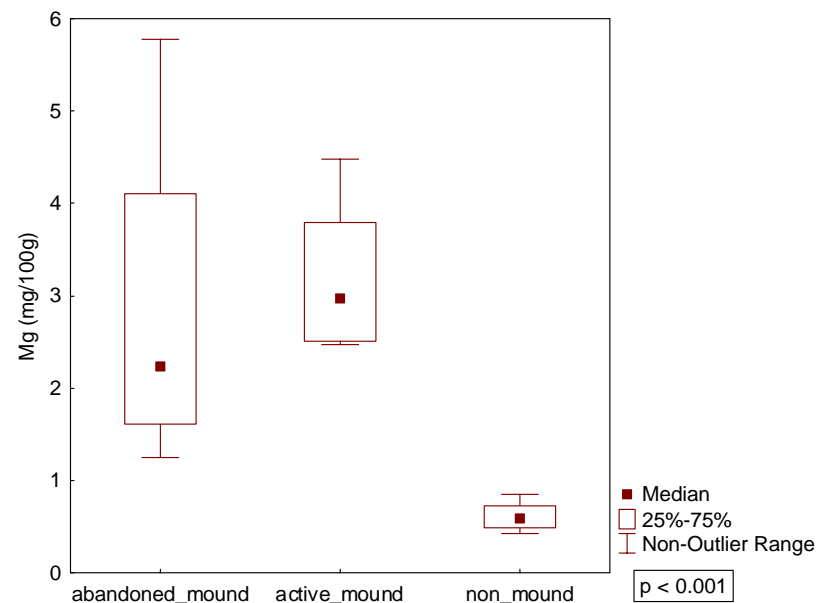
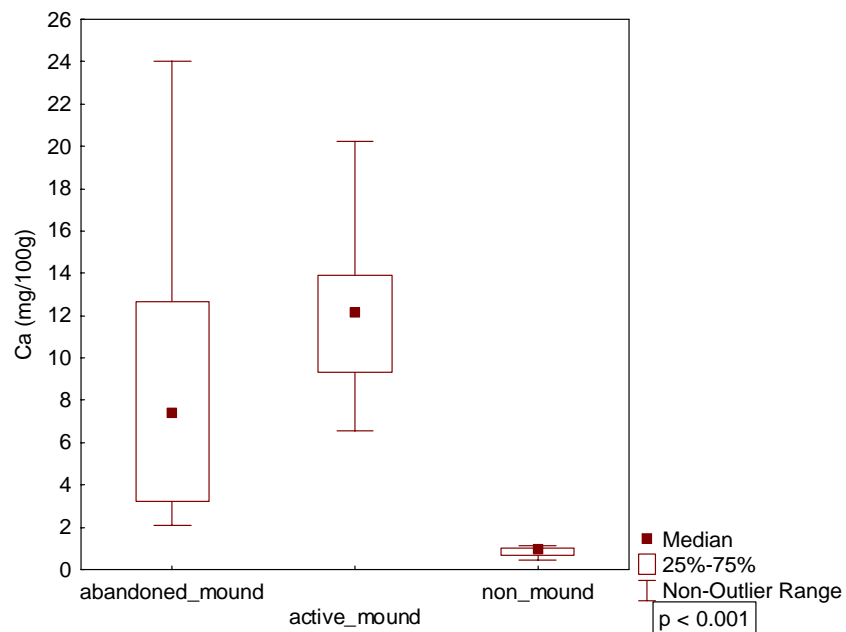


Measurements show that mounds are more fertile than non-mound sites



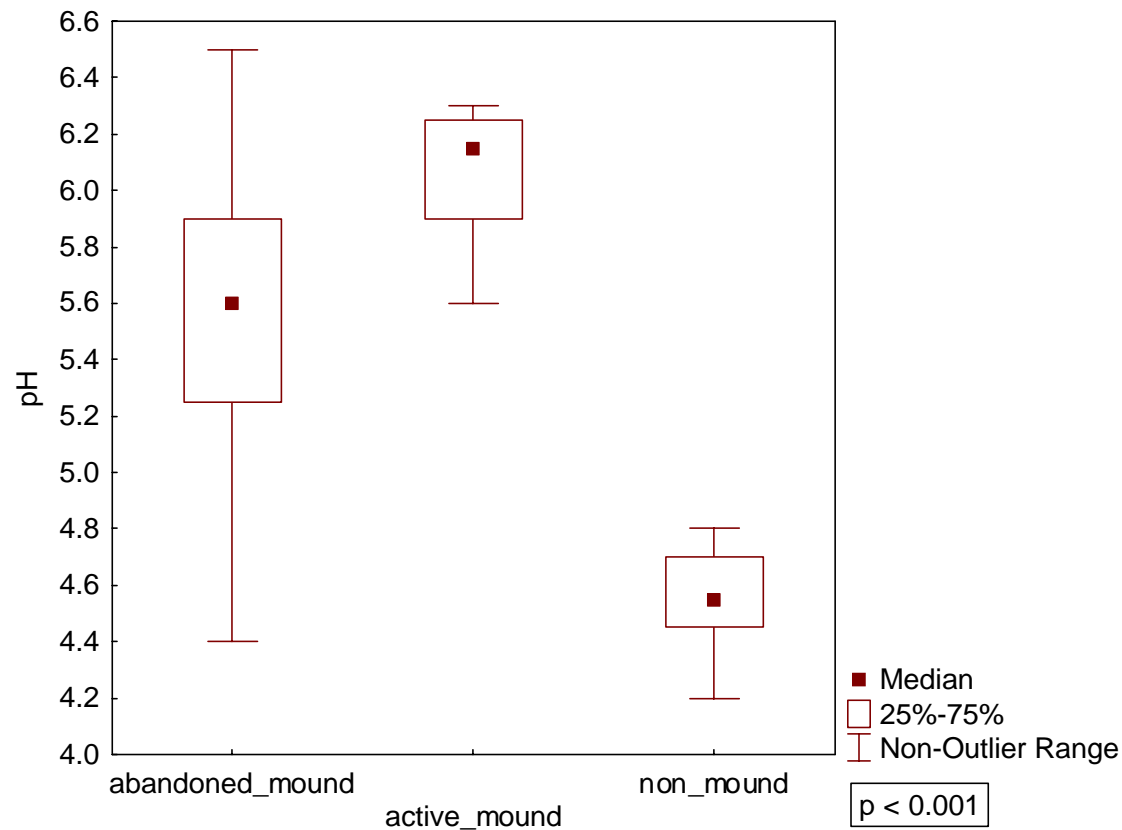


Also, exchangeable bases (Ca & Mg) were significantly higher at mounds than non-mounds





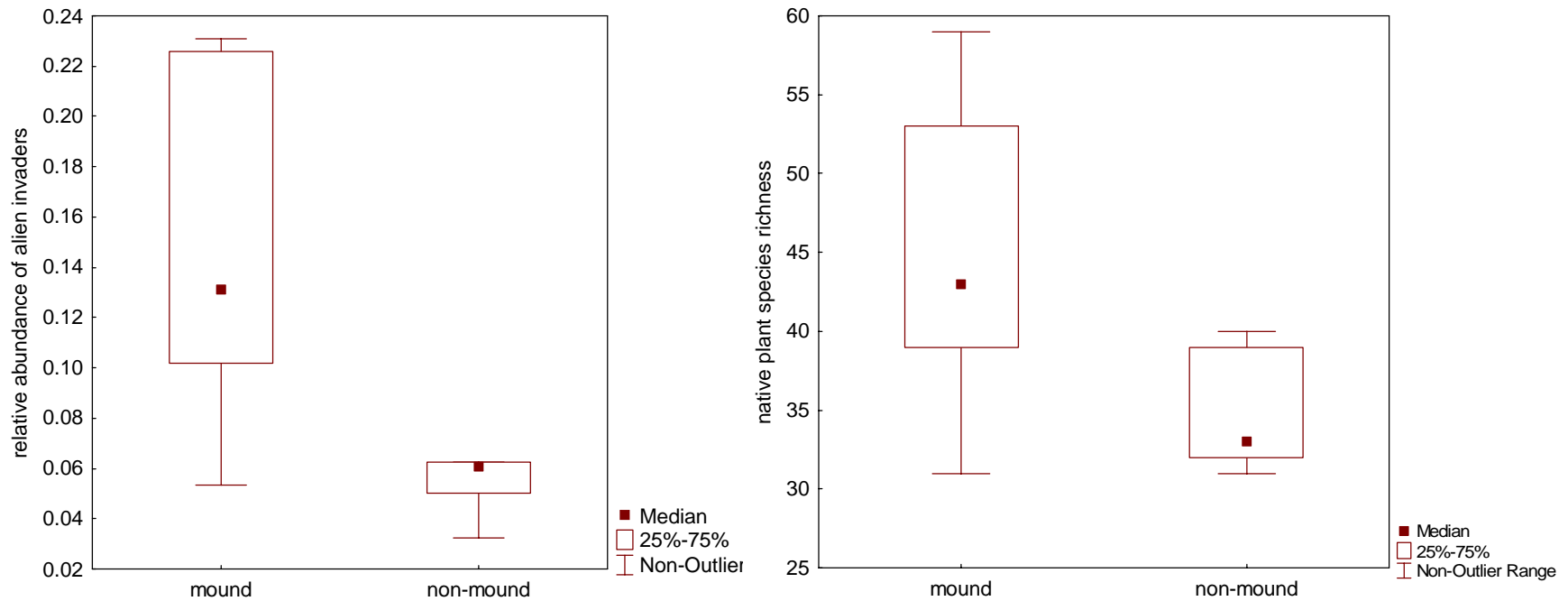
Further, non-mound soils were more acidic than mound soil



The main conclusion from these statistical tests is that the fertility gradient between mounds and non-mounds is quite high



The response of alien plant invaders to soil modification by termites did not differ from that of native species

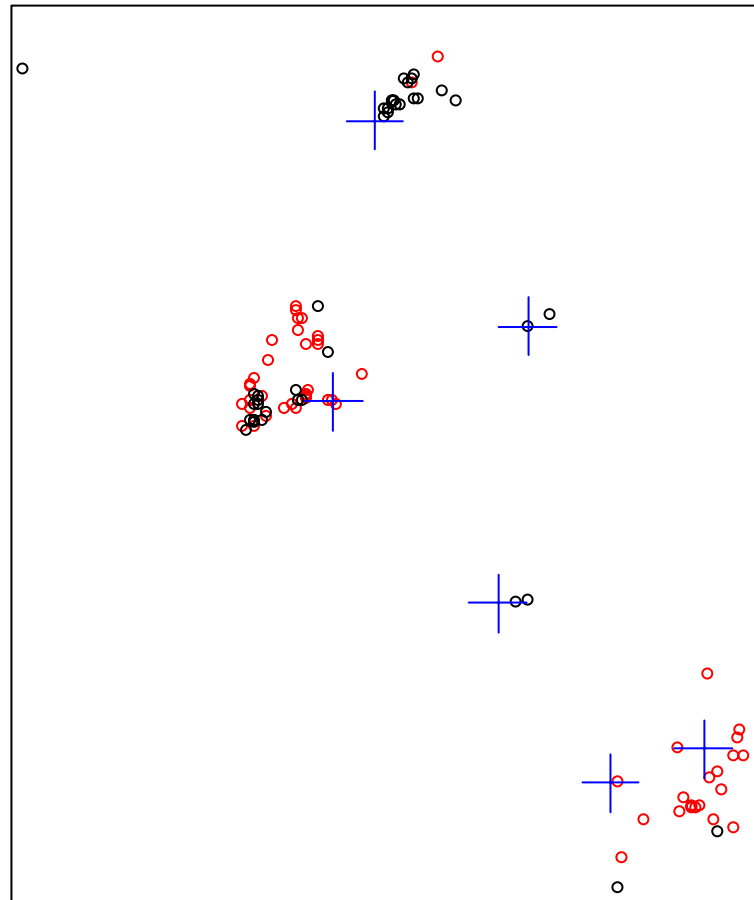


Both native plant species richness and the abundance of aliens relative to that of natives were significantly higher at mounds than non-mounds (Mann-Whitney test, $P < 0.01$, $n=20$)



Alien shrubs clump around mounds suggesting that conditions at mounds are more favourable for their growth

Alien shrubs and mounds

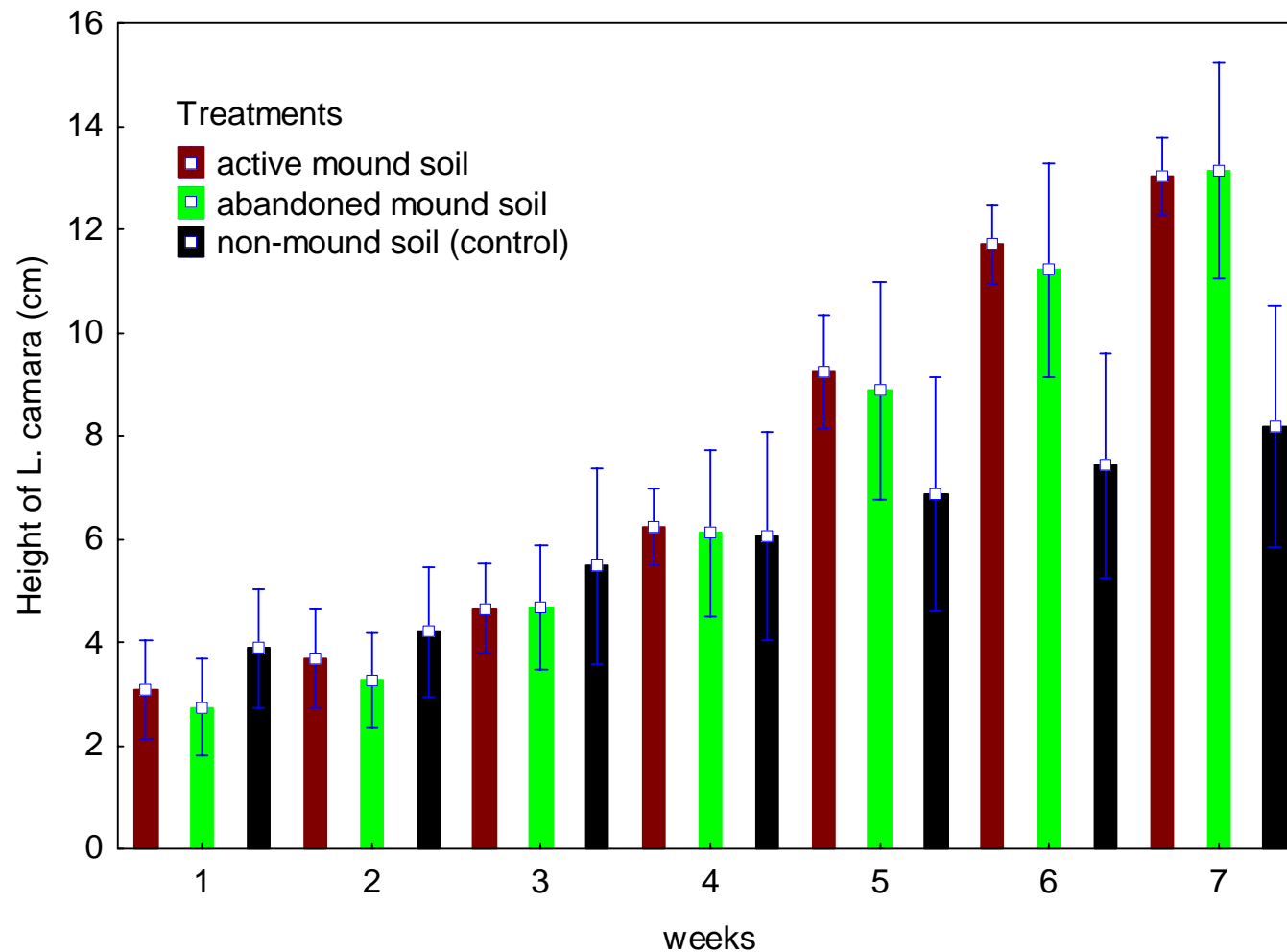


- ◇ *L. camara*
- ◇ *D. erecta*
- + Centroid of termite mound

Plot size = 200 m x 200 m



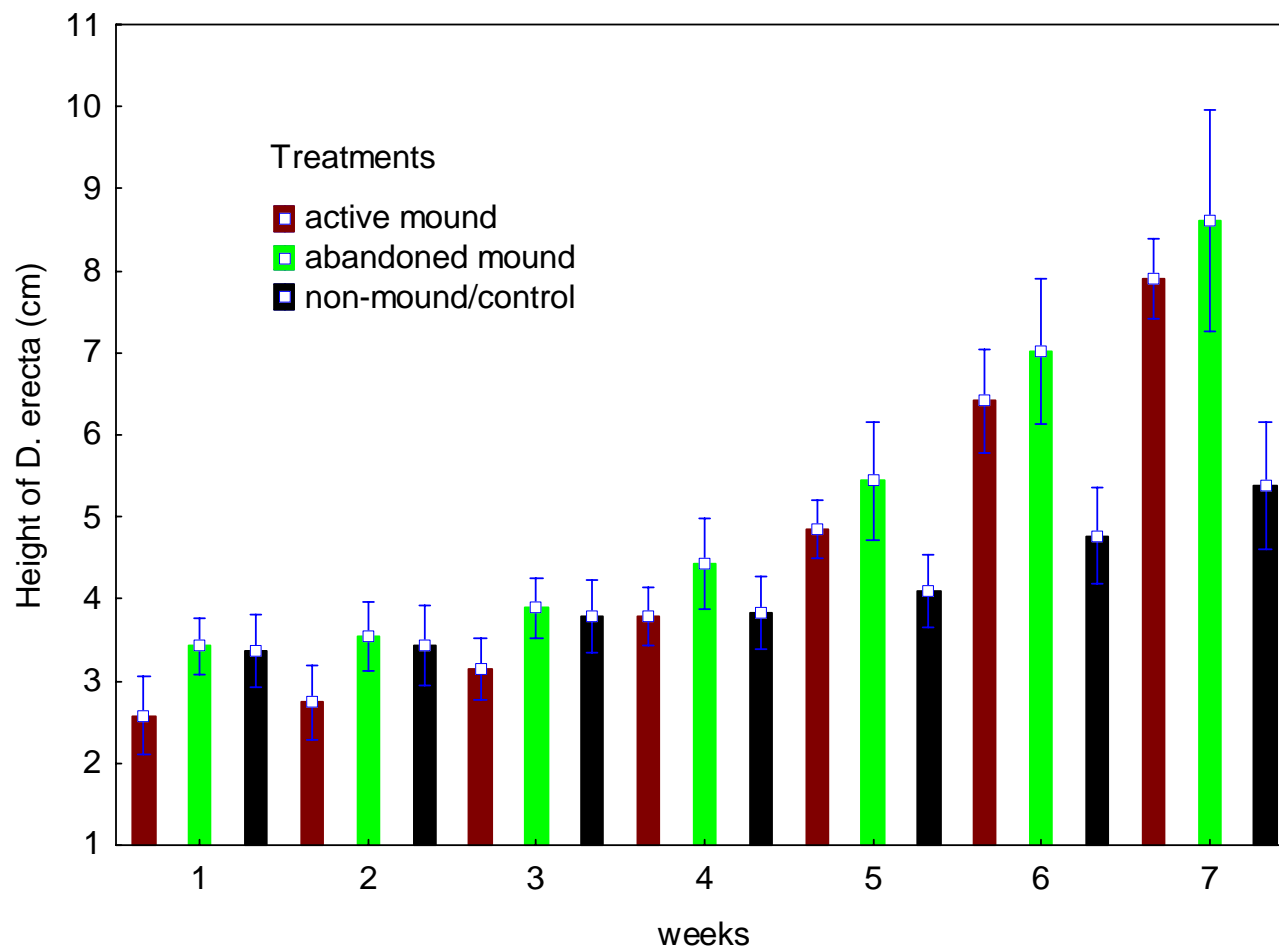
Greenhouse measurements show that *L. camara* plants grow faster at mounds than at non-mound sites



After 7 weeks, plants in the control group were significantly shorter than those in the treatment groups



Similarly, *D. erecta* plants perform better at mounds than at non-mound sites



After 5 weeks, plants in the control group were significantly shorter than those in the treatment groups



Conclusions

- Our results clearly suggest that through creating spatial environmental heterogeneities, termites (*Macrotermes* genus) enhance the invadability of southern African savannas by alien plants



Acknowledgements

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