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UNIVERSITY OF KWAZULU-NATAL
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An assessment of the defoliation tolerance of mesic grassland species

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Background

- Grasslands
  - Herbivore-induced changes
  - Abundance and composition of plant species

- Herbivore effect has been well studied
  - Grazing increasers and decreasers
  - Vertebrate herbivores influence
    - More than just the removal of biomass
    - Induces production of chemical and physical defences

- Changes in plant communities
  - Preference
  - Disturbance
  - Tolerance
  - Interaction
- Few investigations with contradictory results
  - Anderson & Briske (1995) vs Bullock et al. (2001)
- Role of plant tolerance to herbivory?
- Aimed to determine the productivity of four grass species following simulated herbivory

Methods

NM Tainton Arboretum

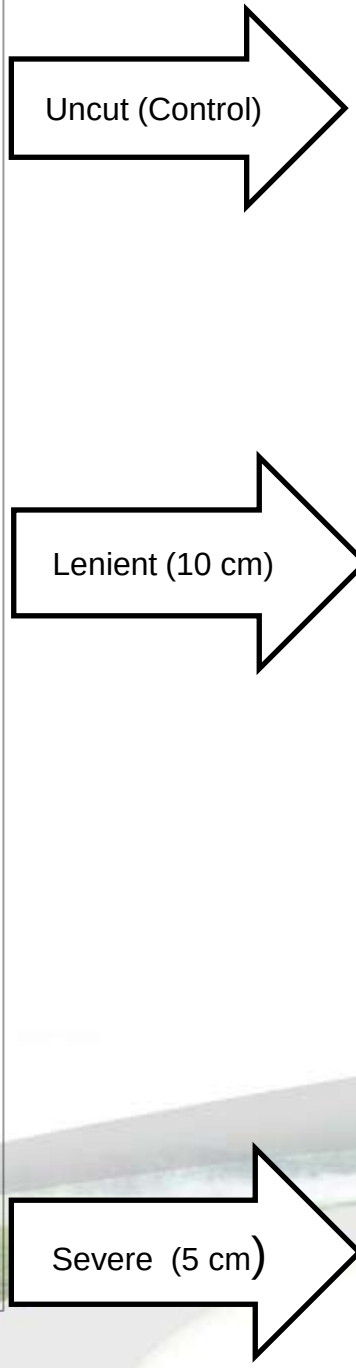
1. *Themeda triandra*

2. *Tristachya leucothrix*

3. *Eragrostis curvula*

4. *Eragrostis plana*

- 2015/2016 summer growing season
- Undefoliated control established
- 7 treatments (6 replicates per species, total =168 plants)
  1. Control (not defoliated)
  2. Defoliated once, lenient clipping (10 cm)
  3. Defoliated once, severe clipping (5 cm)
  4. Defoliated twice, lenient clipping
  5. Defoliated twice, severe clipping
  6. Defoliated three times, lenient clipping
  7. Defoliated three times, severe clipping



Results

Table1. Results of analysis of variance of main effects and interactions for mean cumulative yield of four grass species.

Source of variation	d.f.	s.s.	m.s	F-ratio	p-value
Control	1	1.132	1.132	0.84	0.361
Species	**3**	**41.658**	**13.886**	**10.32**	**<0.001**
Control. Intensity	**1**	**5.855**	**5.855**	**4.35**	**0.039**
Control. Frequency	2	1.073	0.537	0.40	0.671
Control. Species	3	7.049	2.350	1.75	0.161
Control. Intensity. Frequency	2	1.109	0.554	0.41	0.663
Control. Intensity. Species	3	0.540	0.180	0.13	0.940
Control. Frequency. Species	6	7.749	1.292	0.96	0.455
Control.Intensity.Frequency.Species	6	13.549	2.258	1.68	0.131
Residual	133	178.896	1.345		
Total	160	253.234			

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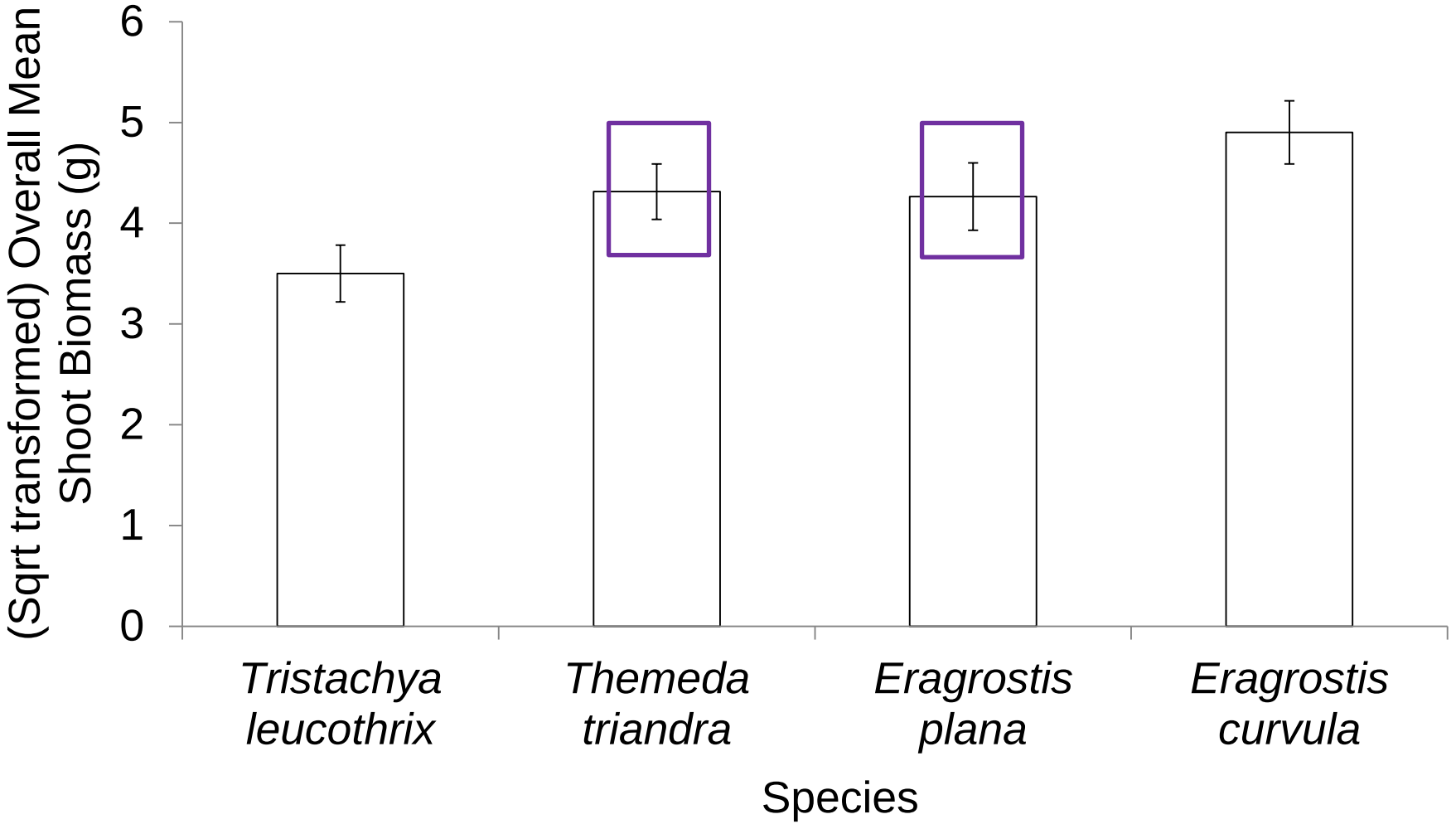
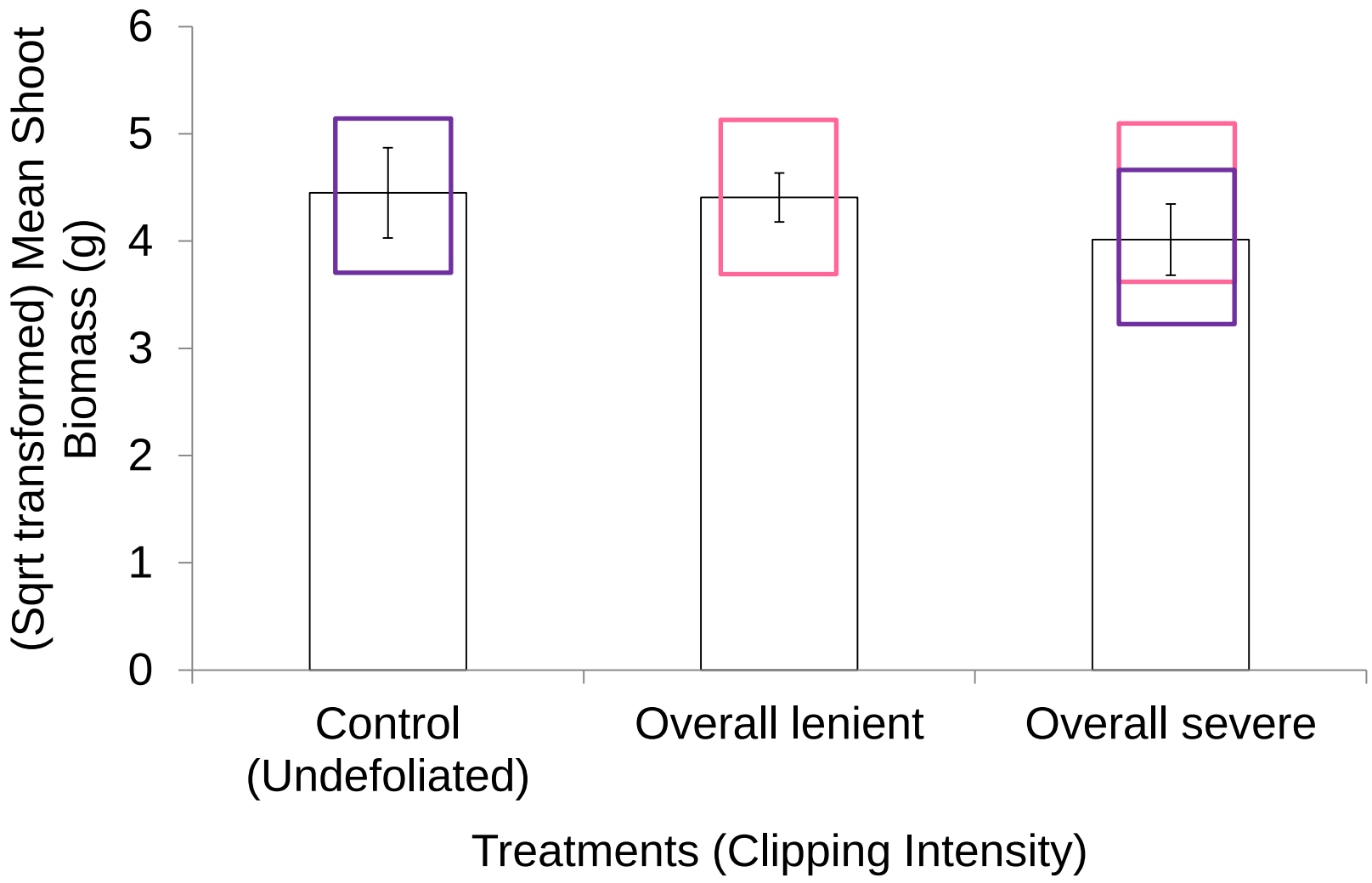
Tristachya leucothrix < *Themeda triandra* = *Eragrostis plana* < *Eragrostis curvula*




(Sqrt transformed) Mean Shoot Biomass (g)
6
5
4
3
2
1
0
Control (Undefoliated)
Overall lenient
Overall severe
Treatments (Clipping Intensity)

Results indicate….

1. Grass species were different in yield
2. Clipping intensity is important
3. Clipping frequency is less important

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Conclusion

- Increaser and decreaser ability to maintain growth
- Studies show
  - Productivity maintained regardless of intensity
  - Effect of defoliation on yield is not related to intensity
- Impact influenced by
  - Recovery time
  - Interaction of environmental conditions
- Further studies

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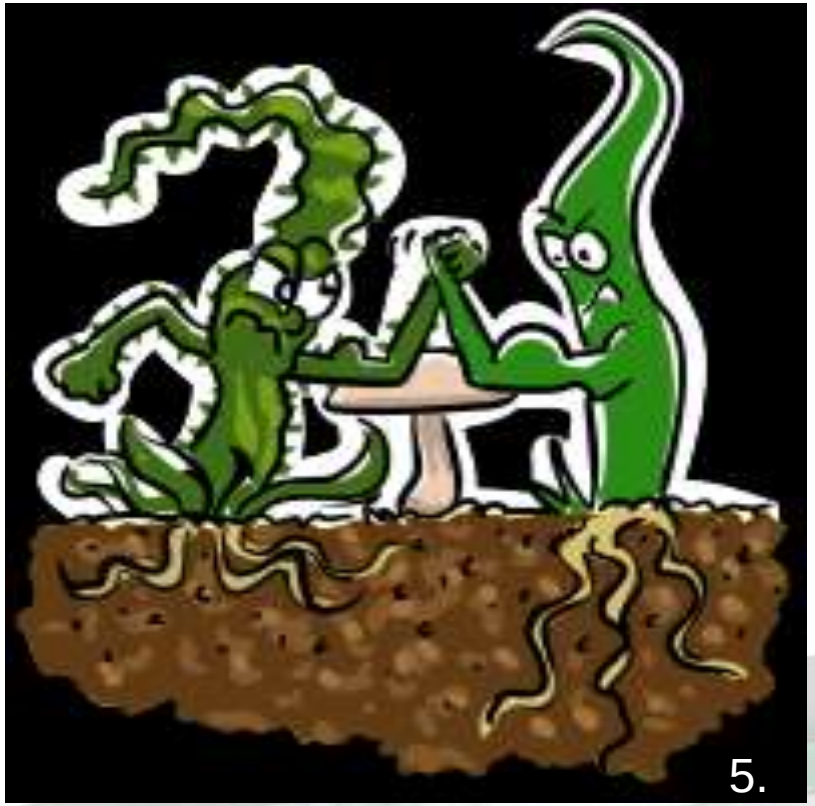
What is next?

- Further analyses
  - Root biomass
  - Tiller production
  - Plant height

Competition



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- Mr. Ngcobo & field assistants
- Audience

- References (species pictures)

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Thank you