Assessing the impacts of *Acacia mearnsii* on grazing provision and livestock production

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Invasive Alien plants (IAPs) transported across the globe for various reasons:

- forestry
- agriculture
- horticulture
- other
Alien plants, mainly trees and woody shrubs, have invaded an estimated 10.1 million ha of South Africa and Lesotho or an equivalent condensed area is 1.7 million ha.

Alter Ecosystem functioning through Excess use of resources: water, light & oxygen or by adding resources such as (nitrogen) (Richardson and van Wilgen, 2004)

Consequences: changes in landscape structure, hydrological regimes, fire frequency & intensity, species richness, composition of the native flora & fauna (Richardson and van Wilgen, 2004)
Acacia mearnsii is an extensive invader in South Africa

- Ever green, leguminous tree, native to Australia
- Introduced: 1864 (Nyoka, 2003)
- Provides: shade, windbreaks, commercial tannin, fuel wood
- Invades habitats: grasslands, forests, riparian zones, savannas, roadsides

- Threatens local vegetation:
  - water
  - soil nutrients
  - organic matter

- Increase water loss from riparian zones
- Little has been done to assess its impacts on grazing provision
AIM: To improve understanding of impacts of *Acacia mearnsii* invasion on grazing and related services

Impacts on growth form dominance of the indigenous vegetation spp:

| Density impacts on forage quality and quantity | Density impacts on basal cover |

Impacts on soil resources and conditions required to support grazing:

| Density impacts on soil structure and composition | Density impacts on soil moisture content |
METHODS:
Study site: Stutterheim
Methods: Experimental Farms

Invaded

Cleared
**METHODS:** data collection

**Experimental sites for sampling:** 4 Treatments

- Uninvaded
- Light
- Dense
- Cleared
METHODS: Vegetation assessment

- 5 sites in each treatment
- Point to tuft method: record species
- Disc Pasture: herbaceous biomass
METHODS: Soil assessment

- 10 x 1m² quadrat on each 100m transect
- Soil samples: moisture & composition, texture etc.
Results: Ecological groups

Decreasers: palatable species, decrease with overutilisation or underutilisation

Increaser I: species that increase with underutilisation

Increaser II: increase with overgrazing

Increaser III: increase with selective grazing

Others: grass invaders, forbs and serge

Bare: refers to bare ground
RESULTS: Grass species composition and basal cover

- **Grass species composition and basal cover**

- **A. mearnsii invasion status**
  - Bare
  - Decreaser
  - Increaser I
  - Increaser II
  - Increaser III
  - Others

- Mean ±S

- P ≤ 0.05
RESULTS: Biomass production

**Acacia mearnsii invasion status**

- **Uninvaded**
- **Cleared**
- **Light**
- **Dense**

**Biomass production (kg/ha)**

- **P≤0.05**
- **Mean SE**

### Bar Chart Details

- **Uninvaded**: a
- **Cleared**: b
- **Light**: c
- **Dense**: d

The chart indicates significant differences in biomass production among the different invasion statuses of *Acacia mearnsii*.
**RESULTS**: Soil nitrogen content

![Bar chart showing the mean soil nitrogen content for different invasion statuses of Acacia mearnsii.](chart)

- **Uninvaded**
- **Cleared**
- **Light**
- **Dense**

Mean N% with error bars indicating ±SE, and letters a, ab, b indicating significant differences at P≤0.05.
RESULTS: Moisture content

Moisture content of Acacia mearnsii invasion status.

- Uninvaded
- Cleared
- Light
- Dense

Mean ±SE, P≤0.05
Conclusions

- High density invasions of *A. mearnsii* have negative effects on rangelands productivity
- Removal of *A. mearnsii* improves grazing resources: nitrogen content, moisture, etc.

Recommendations

- Programmes need to be developed to assist emerging farmers with clearing invasives so as to enhance the speed recovery and to improve likelihood of success
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Thank you for your attention