A floristic comparison between natural and disturbed grassland following the removal of pine plantations

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CAN A GRASSLAND *RESTORE* TO ITS NATURAL STATE AFTER SOME TIME – FOLLOWING THE REMOVAL OF PINE SPECIES???

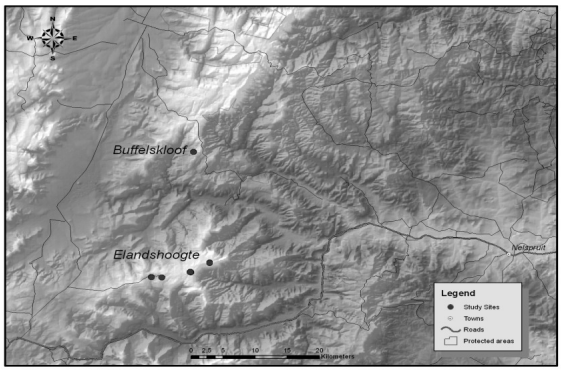
"*Once a grassland is transformed through afforestation, the change is* ***permanent***" (Van Wyk, date unknown).

To test this we compared natural grassland with disturbed grassland at different *ages* after excision.

Background information

- *Grasslands:*
  - **One out of six** grassland plants is a grass. Rest are forbs, shrubs, sedges or grasslike plants (Camp & Daugherty, 1997:78).
  - Fire is *critical* in the conservation and management of a grassland (Van Wyk, 2003).
- *Forestry:*
  - Excision: delineation of wetlands and riparian areas (DWAF, 2005); rocky areas - insufficient soil depth / poor tree growth; other management considerations - firebreaks, infrastructure.
  - Grasslands on plantation: *in between* tree compartment. Requires: specific conservation and special management (Marais, 2000:22).
- *Restoration and succession:*
  - Grazing and fires - large influence on grassland restoration (Rostagno, 2006:169).
  - Restoration achieved through *succession* (Hambler, 2004:276).
  - Mostly weeds and indigenous pioneer plants that colonise disturbed habitats (Hugo *et al.*, 1997:43).

Study Area in Mpumalanga



Methodology used

- Field surveys:
  - 6 research areas, each with 2 adjacent grassland sites: 1 natural and 1 excised (disturbed).
  - Excised ages 2 – 18 yrs.
  - Altitudes: 1669 – 2064 m
  - 10 sample plots in natural and 10 in excised sites.
  - Size of sample plots: 2 x 2m quadrats (x 10 plots = 40m² total sample area). Total of 120 sample plots.
- Statistical analysis:
  - PRIMER version 5
  - *EstimateS* (species richness) version 8.0
- Floristic comparison of life forms

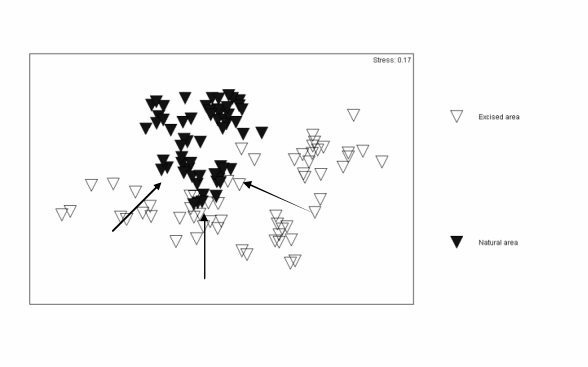
Example of research area: Waste site (12yr) – excised & natural plots

Example of research area: Taljaardsvlei 16yr site – excised & natural plots

Results overview

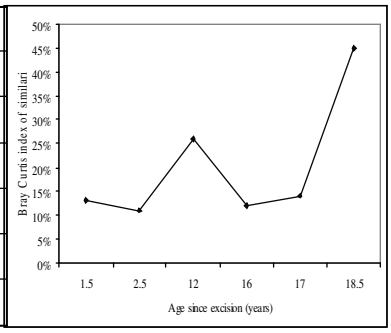
- Great diversity between natural and excised areas expected and verified.
- Rate of succession seems very slow - possible reasons environmental variables, i.e. high altitude, soil type and depth, fire frequency etc.
- Weak successional trend identified amongst different *aged* sites.
- Not studied whether burning has impact on rate of succession (i.e. faster restoration).

Degree of succession in plantation vegetation plots



Bray Curtis Similarity index (table & graph)

Excised area	Similarity to natural area
Rock Gardens 18,5yrs	45%
Buffelskloof 17yrs	14%
Taljaardsvlei 16yrs	12%
Waste site 12yrs	26%
Taljaardsvlei 2,5yrs	11%
Dams site 1,5yrs	13%



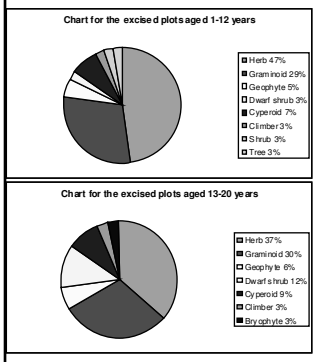
Species richness

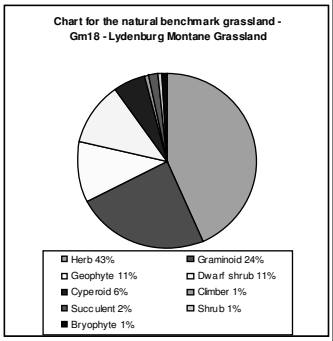
Site name	Excised	Natural
Rock Gardens 18,5 yrs	19	31
Buffelskloof 17 yrs	15	40
Taljaardsvlei 16 yrs	10	44
Waste site 12 yrs	12	32
Taljaardsvlei 2,5 yrs	24	49
Dams site 1,5 yrs	19	25

Fuel load values (kg/ha)

Site name	Excised	Natural
Rock Gardens 18,5 yrs	3609	4678
Buffelskloof 17 yrs	4511	4511
Taljaardsvlei 16 yrs	3129	5407
Waste site 12 yrs	6596	6596
Taljaardsvlei 2,5 yrs	5557	6935
Dams site 1,5 yrs	6244	9109

Floristic structure of life forms





Conclusion

- Excised areas available for study not old enough (oldest site 18,5 yrs).
- Other studies - older sites and different altitudes.
- Replicate this study - successional and restoration progress over time.
- Further investigation - determine influence of fire and burning on restoration / succession.
- Above mentioned will help managers and foresters in better decision making.
- Grassland restoration will take long time (NEVER?)

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THANK YOU

ANY QUESTIONS?