

IMPACT OF UHDG ON VELD CONDITION

FARM VANROOYENSWONING

BY: FRITS VAN OUDTSHOORN



Supported by:



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STUDY AREA:

- Farm Van Rooyenswoning
- 15 km southeast of Reitz
- Free state province

STUDY PERIOD:

Grasses: February 2019 and
February 2021

Forbs: January 2022



BACKGROUND

- Project initiated by Danie Slabbert (farmer), Grain SA and Landbouweekblad
- UHDG started December 2017.
- Herd size = \pm 500 drakensberger cows.
- Rectangular cells within a 100 m wide electrified strip
- Camp sizes vary, from 100 x 7 m to 100 x 15 m (biomass dependant).
- Move hourly basis (from 6 am to 7 pm) during the summer months (mid-October to mid-April / 6 months).
- Average animal density is about 5 000 LSU's/ha/h (0.6 ha/LSU/year).
- Ultra-high-density grazing = non-selective grazing, high degree of trampling, a high concentration of dung and urine.
- Winter months (mid-April to mid-October) same system on maize and soy residue + cover crops.
- The farm was admittedly heavily selectively grazed before the introduction of UHDG.



± 76% GRASS BIOMASS CONSUMPTION

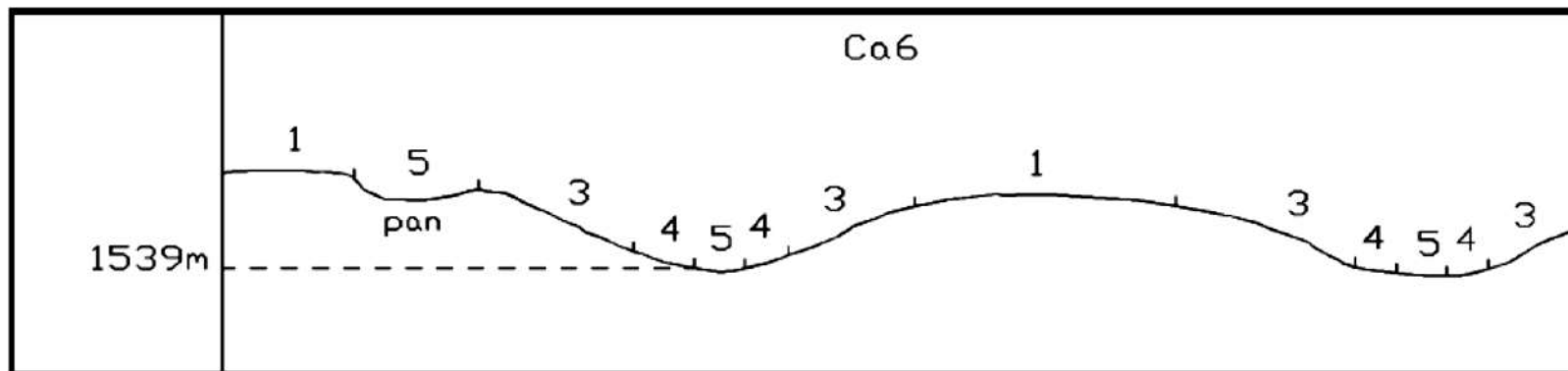


6 135 kg DM/ha

1 473 kg DM/ha
Consumption 4 662 kg/ha (76%)

ENVIRONMENTAL FEATURES

- Undulating topography
- The soils = sandy to sandy loams
- Study area = marginal for cropping
- Warm temperate = cold dry winters and warm wet summers
- Frost common
- Rainfall summer = about 675 mm/annum
- Grazing capacity norm = 4 ha/LSU (Study area = 1,2 ha/LSU)



METHODS - SITES

Site no.	Location in terrain	Data	Grazing management	Stocking density
1	Crest	Control 1	Selective grazing	4 ha/LSU
2	Midslope	Main	Non-selective grazing	1.2 ha/LSU
3	Footslope	Control 2	No grazing	N/A
4	Footslope	Main	Non-selective grazing	1.2 ha/LSU
5	Crest	Main	Non-selective grazing	1.2 ha/LSU
6	Valley bottom	Main	Non-selective grazing	1.2 ha/LSU
7 (2021)	Midslope	Control 1	Selective grazing	4 ha/LSU

Control 1 = 2-camp system, 1 month per camp, 4 ha/LSU

METHODS - SITES



CONTROL - SELECTIVE GRAZING (sites 1 + 7)



CONTROL - NO GRAZING (site 3)



NON-SELECTIVE GRAZING (sites 2 & 4)



NON-SELECTIVE GRAZING (sites 5 & 6)



METHODS

- **Grass species composition – 100 m transect + observation.**
 - Grass diversity, ecological index status groups, veld condition score % (VCS%), grazing capacity based on grazing value of grass species (1 – 10)(Benchmark method).
- **Grass biomass production (2021) – disc pasture meter**
 - Biomass production (kg/ha), grazing capacity (biomass method – Moore & Odendaal)
- **Forb species composition (2022) – 5 x 1m² quadrates (Andrew Hankey – SANBI)**
 - Forb density, diversity and groups (e.g. families)



METHOD - ECOLOGICAL STATUS INDEX

? = Classification based on grass species reaction to grazing

Group	Description 1	Description 2	VCS% value
Decreaser's	Grasses common in good veld	Palatable perennial grasses	10
Increaser I's	Grasses common in undergrazed veld	Unpalatable perennial grasses	7
Increaser II's	Grasses common disturbed veld	Pioneer and subclimax grasses	4
Increaser III's	Grasses common in selectively overgrazed veld	Extremely unpalatable perennial climax grasses	1

RESULTS – GRASS SPP. DIVERSITY

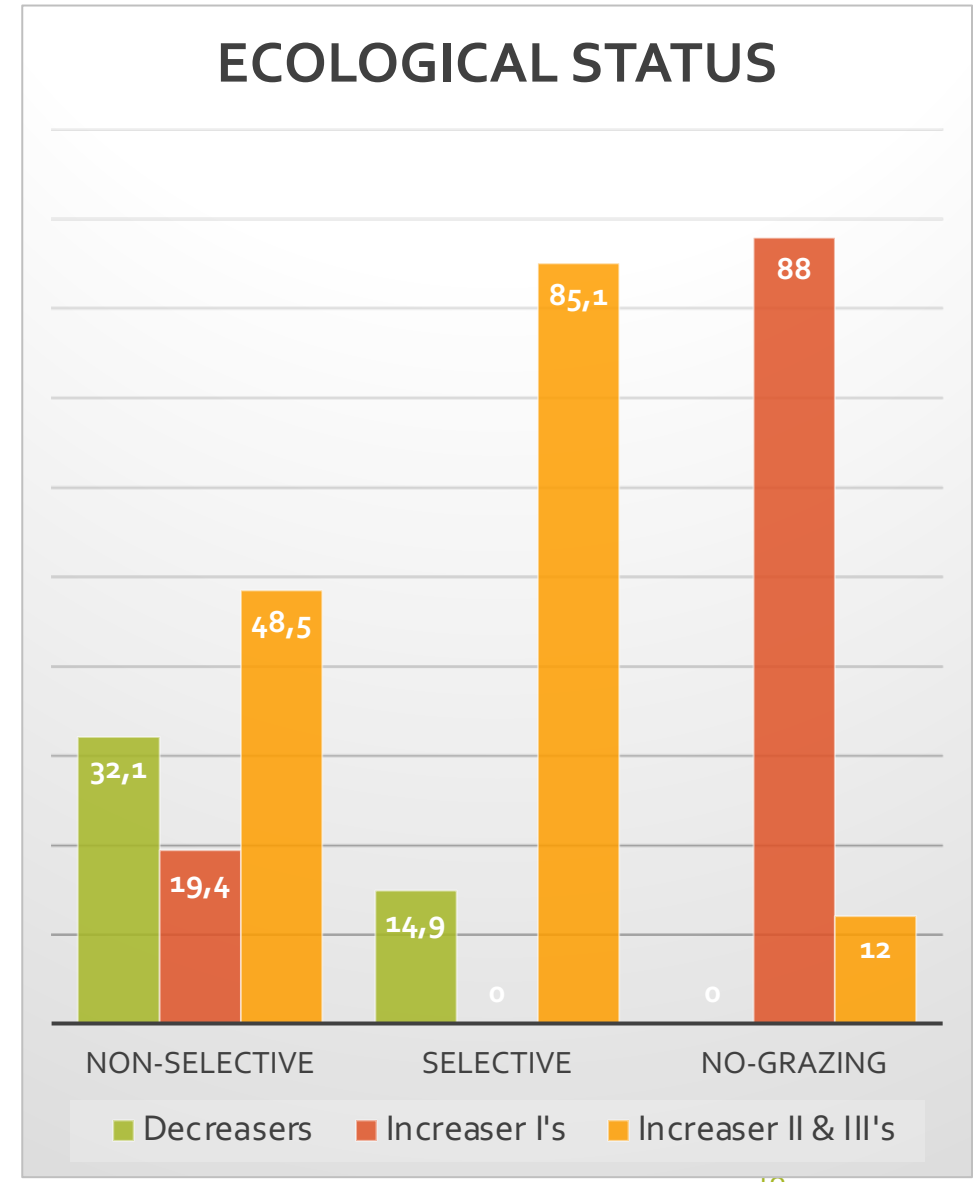
Grazing approach ↓	Grass species recorded				Grass species recorded and observed			
	2019	2021	VAR	Ave	2019	2021	VAR	Ave
Non-Selective	9,3	11,8	2,5	10,5	16,8	23,0	6,3	19,9
Selective	6,0	6,5	0,5	6,5	11,0	9,0	-2,0	10,0
No grazing	9	4	-5,0	6,5	17	9	-8,0	13,0

RESULTS - ECOLOGICAL STATUS GROUPS

Grazing approach ↓	El group	Decreaser's %			Increaser I's %			Increaser II's %			Increaser III's %		
	Year	2019	2021	+ or -	2019	2021	+ or -	2019	2021	+ or -	2019	2021	+ or -
Non-selective		19,7	32,1	12,4	17,6	19,4	1,8	23,0	21,2	-1,9	39,7	27,4	-12,3
Selective		8,0	14,9	5,7	0,0	0,0	0,0	82,0	43,3	-38,7	10,0	41,8	31,8
No grazing		13,2	0,0	-13,2	67,9	88,0	20,1	7,5	6,0	-1,5	11,3	6,0	-5,3

SUMMARY - ECOLOGICAL STATUS GROUPS

Grazing approach ↓	ECOLOGICAL STATUS GROUPS (%)		
	Decreasers	Increaser I's	Increaser II & III's
	(decrease with overgrazing)	(increase with undergrazing)	(increase with overgrazing)
Non-selective	32,1	19,4	48,5
Selective	14,9	0	85,1
No-grazing	0	88	12



RESULTS – VELD CONDITION SCORE (VCS%) BENCHMARK METHOD

Grazing approach ↓	VCS % (based on grazing value)			VCS% grazing capacity (ha/LSU)		
	2019	2021	VAR	2019	2021	VAR
Non-selective	37,5	45,4	7,9	4,8	4,1	0,7
Selective	40,0	30,0	-10	4,3	4,8	-0,5
No grazing	27,9	21,6	-6,3	5,4	6,2	-0,8

RESULTS – GRASS BIOMASS PRODUCTION

(2021 growth season)

Grazing approach ↓	Method →	Dry grass biomass production (kg DM/ha)	Kg grass growth/ mm rain	Biomass grazing capacity (ha/LSU)	Biomass grazing capacity (LSU/ha)
Non-selective		5 212	7,7	2,7	0,38
Selective		3 153	4,7	5,0	0,20
No grazing		6 760 *	10,0	3,0	0,33

* The no-grazing site had extremely high levels of moribund

UHDG GRASS SPECIES - MOVERS AND SHAKERS

↑↓	Scientific name	Common name	Grazing value	Ecological status	%
↑	<i>Andropogon appendiculatus</i>	Vlei bluestem	8	Decreaser	6,3
↑	<i>Setaria nigrirostris</i>	Black-seed bristle grass	7	Decreaser	5,9
↑	<i>Themeda triandra</i>	Red grass	9	Decreaser	3,0
↑	<i>Eragrostis chloromelas</i>	Curly leaf love grass	4	Increaser II	2,9
↑	<i>Heteropogon contortus</i>	Spear grass	6	Increaser II	1,9
↓	<i>Cymbopogon dieterleniae</i>	Thread-leaved turpentine grass	2	Increaser I	-2,5
↓	<i>Paspalum dilatatum</i>	Dallis grass	8	Decreaser	-3,1
↓	<i>Setaria sphacelata torta</i>	Creeping bristle grass	6	Decreaser	-4,4
↓	<i>Eragrostis curvula</i>	Weeping love grass	6	Increaser II	-8,4
↓	<i>Aristida junciformis</i>	Gongoni three-awn	1	Increaser III	-9,7



FORBS (WILD FLOWERS)

Forb density and species diversity;

Site group →	Non-selective					Selective			No-grazing	
Site no. →	2	4	5	6	Ave	1	7	Ave	3	Ave
Density (plants/m ²)	24,2	19,6	32,8	38,8	28,85	88,8	55,4	72,1	31	31
Species recorded	24	8	14	13	14,75	16	17	16,5	15	15
Other species observed	33	11	31	11	21,5	11	9	10	21	21
Total species	57	19	45	24	36,25	27	26	26,5	36	36

FORB FAMILIES

Family name	Family common name	Non-selective grazing		Selective grazing		No grazing		Average	
		%	# spp.	%	# spp.	%	# spp.	%	# spp.
Asteraceae	Daisy family	40,4	28	4,4	14	51,6	14	32,1	18,7
Cyperaceae	Sedge family	14,9	1	34,4	1	13,8	1	21,0	1,0
Commelinaceae	Wandering Jew family	8,1	2	5,5	1	17,6	1	10,4	1,3
Sterculiaceae	Cacao family	0,9	2	26,7	2	0,0	0	9,2	1,3
Fabaceae	Legume family	5,7	11	5,2	2	0,0	0	3,6	4,3
Polygonaceae	Knotweed family	9,5	1	0,3	1	0,5	1	3,4	1,0
Aizoaceae	Vygie family	0,0	0	9,2	1	0,0	0	3,1	0,3
Euphorbiaceae	Euphorbia family	0,3	1	2,1	2	4,3	1	2,2	1,3
Gentianaceae	Gentian family	1,1	1	0,0	0	2,7	1	1,3	0,7

Number of families →	Non-selective grazing	35
	Selective grazing	20
	No grazing	17



GENERAL OBSERVATIONS

The problem plant Bankrupt bush (*Seripium plumosus*) is severely damaged by UHDG and is replaced by grasses.



GENERAL OBSERVATIONS

- Large tufted unpalatable grasses are lightly to moderately grazed (left) and often heavily trampled (right).
- In some instances, broad-leaved grass seedlings are growing in the centre of trampled tufts (photo centre).



CONCLUSION

- Almost all veld condition assessment criteria used in this study indicate higher average values at the non-selective grazing (UHDG) sites compared to the two control site groups (selective grazing and no-grazing).
- Palatable grasses are increasing and unpalatable grasses are decreasing.
- Botanical diversity is higher after 4 years of UHDG and still increasing/changing.
- Biomass production is higher under the same rainfall regime.
- One of the most important problem plants in the region is naturally controlled.
- The study is however young, with only two biannual year's of data.

AKNOWLEDGMENTS

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DIE EINDE, BAIE DANKIE

Frits van Oudtshoorn

078 228 0008

frits@alut.co.za

www.workingongrass.co.za



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