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RURAL DEVELOPMENT AND
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The effects of fire frequency on soil water repellency in the semi-arid regions of Eastern Cape

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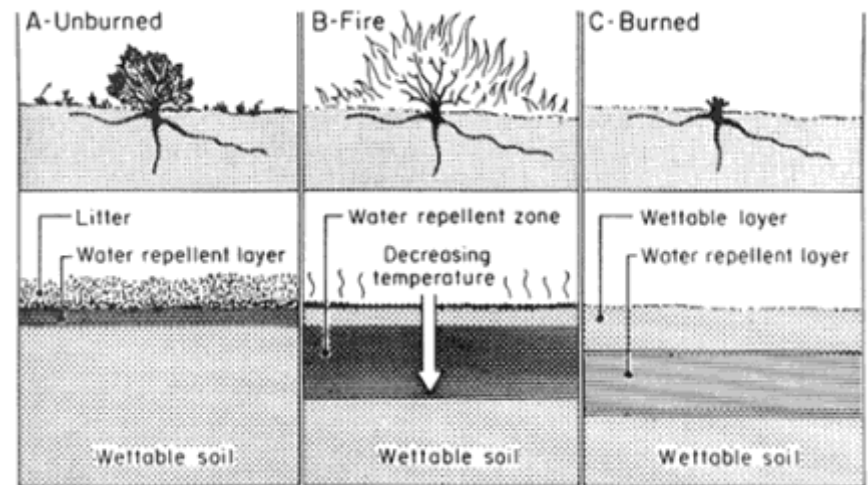
Overview

- Fire – Grasslands and savanna management tool
- key causative factor of soil water repellency
 - Via the translocation of volatilised water repellent organic compounds
- Via the translocation of volatilised water repellent organic compounds



Negative effects

- Reduction in soil water retention
- Decreased infiltration rates
- Plant growth and
- Increased surface run off



Debano LF, 2000



Concerns

- Importance of water increases
- Climate change effect
- Desertification and degradation



Objective

- The objective of the study was to assess the effects of different levels of fire frequencies on soil hydrology and water repellency.



Methodology

- Water Drop Penetration Time (WDPT) test was conducted at
- six depths (0, 1, 2, 3, 4, and 5 cm)
- on six systematically selected locations along two parallel line- transects.

Water Drop Penetration Time	Severity
< 5 seconds	No problems with water repellency
5 seconds–1 minute	Slightly repellent
1–10 minutes	Repellent
> 10 minutes	Severely repellent

Methodology

- Post hoc test (LSD) was used to separate the means between the treatments





Results

Treatment	Replications	0cm	1cm	2cm	3cm	4cm	5cm
k		2.33 ^d	2.33 ^d	3.67 ^c	3.50 ^c	3.83 ^c	3.83 ^c
B1		5.83 ^{cd}	6.00 ^{cd}	10.00 ^{abc}	9.50 ^b	7.83 ^{bc}	7.83 ^{bc}
B2		8.67 ^{cb}	7.00 ^{cd}	6.67 ^{bc}	6.67 ^{cb}	6.17 ^{bc}	8.33 ^{bc}
B3	1	12.33 ^{ab}	17.33 ^a	14.50 ^a	11.83 ^{ab}	16.00 ^a	15.17 ^a
B4		12.33 ^{ab}	13.50 ^{ab}	14.67 ^a	15.17 ^a	11.17 ^{ab}	18.67 ^a
B6		14.17 ^a	17.33 ^a	11.00 ^{ab}	10.83 ^{ab}	11.50 ^{ab}	9.17 ^b
k		17.33 ^a	17.83 ^{ab}	23.17 ^a	10.83 ^{bc}	13.17 ^{ab}	13.17 ^{ab}
B1		8.00 ^c	8.50 ^{bc}	11.50 ^b	9.67 ^c	9.83 ^b	9.50 ^{ab}
B2		10.50 ^{bc}	7.00 ^c	8.17 ^b	8.17 ^c	9.17 ^b	8.00 ^b
B3	2	13.83 ^{abc}	18.50 ^a	16.17 ^{ab}	12.67 ^{abc}	15.17 ^{ab}	14.83 ^a
B4		11.00 ^{abc}	12.67 ^{abc}	14.00 ^{ab}	15.00 ^{ab}	15.33 ^{ab}	12.00 ^{ab}
B6		14.83 ^{ab}	17.67 ^{ab}	17.67 ^{ab}	16.50 ^a	18.17 ^a	13.50 ^{ab}

Means with different letters are statistically significant
($P < 0.05$)

Discussion

- There was significant difference ($p < 0.05$) between the soil depth (0, 1, 2, 3, 4 and 5 cm) for WDPT
- There was also a significant different between treatments ($P < 0.05$)
- However, there was no difference between all fire treatments for repellency (all slight)

Conclusion & Recommendations

- Frequency of burning had a slight effect on water repellency
- The water drop penetration time for biennial, triennial, quadrennial and sexennial burn was higher than the control (I/K)
- To retain Low soil water repellency and high infiltration rate, Biennial is recommended
- Post burning water repellency and infiltration test should also be further researched.
- There should be further research on the effects of fire on water repellency at different vegetation types



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Thank You

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