



The influence of fire on the nutritional ecology of sable antelope in the Kgaswane Mountain Reserve, North-West Province

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Study area

Kgaswane Mountain Reserve
(previously 'Rustenburg Nature Reserve') – **North-West Province**

Part of the **Magaliesberg Protected Nature Area**





Study period

➤ **September 2002-December 2003:**

a) Early dry season (April-July 2003)

b) Late dry season (September-October 2002 & August- October 2003)

c) Transition to wet season (November-December 2002 & October-December 2003)

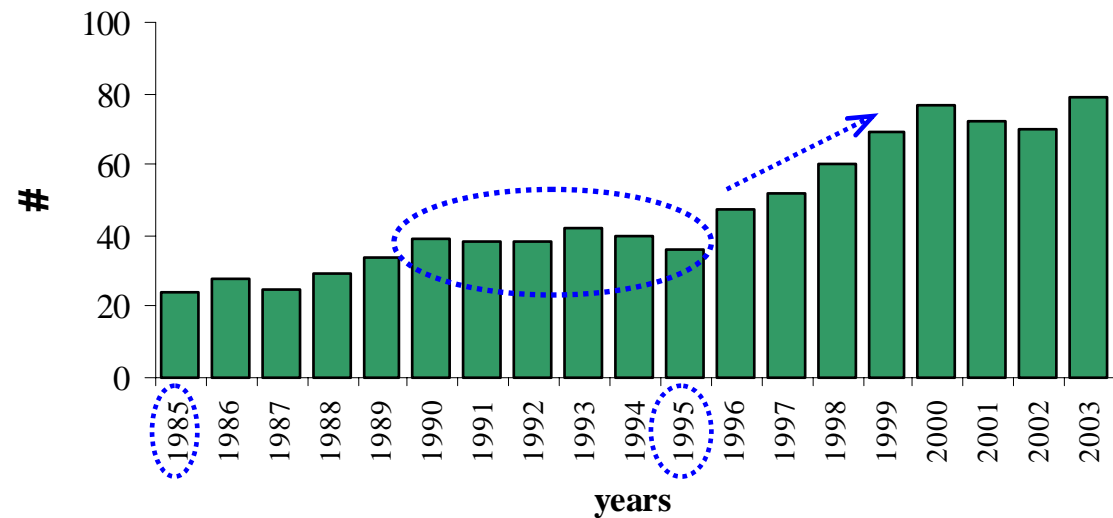




KMR, sable antelope and fire

- **1967**: reserve proclamation & introduction of 12 sable
- **1995**: start of early winter burning regime

Sable population in KMR: 1985-2003



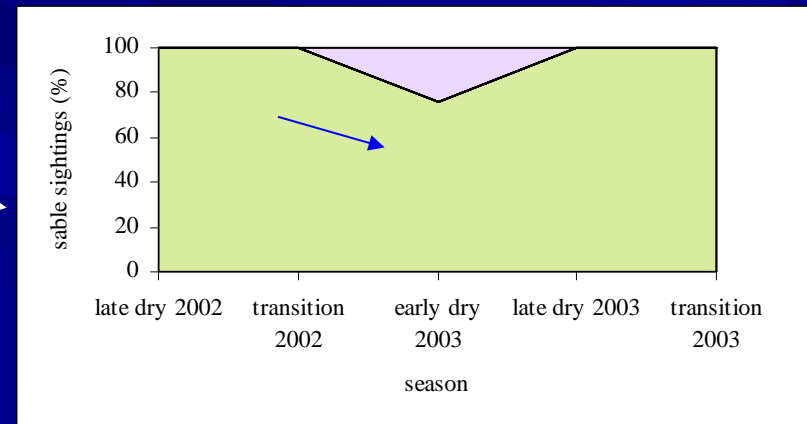
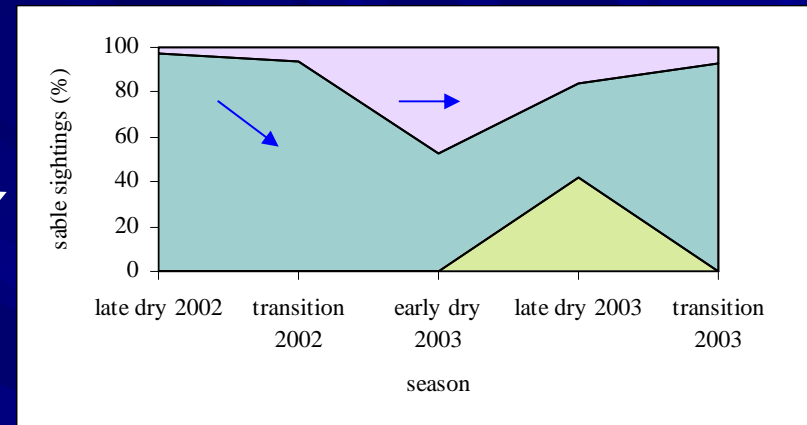


KMR and sable antelope

Two groups:

➤ Woodland herd

➤ Vlei herd



Grassland & vlei



Open woodland



Woodland

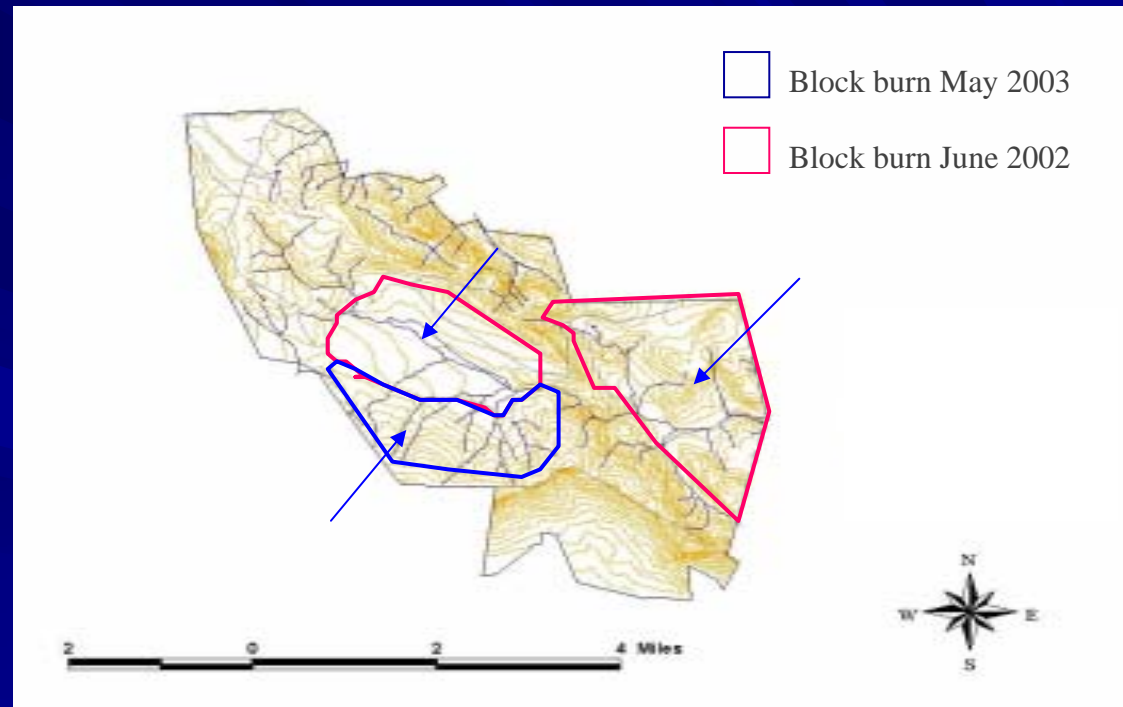
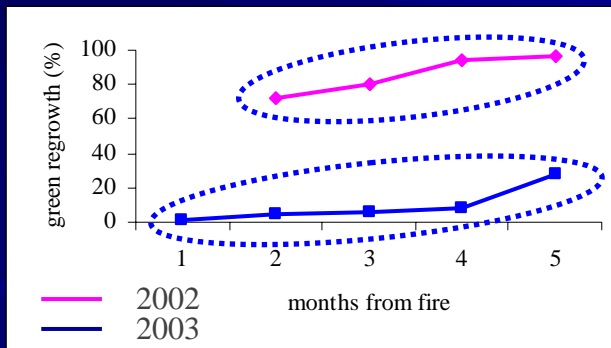




KMR and fire

Prescribed fires:

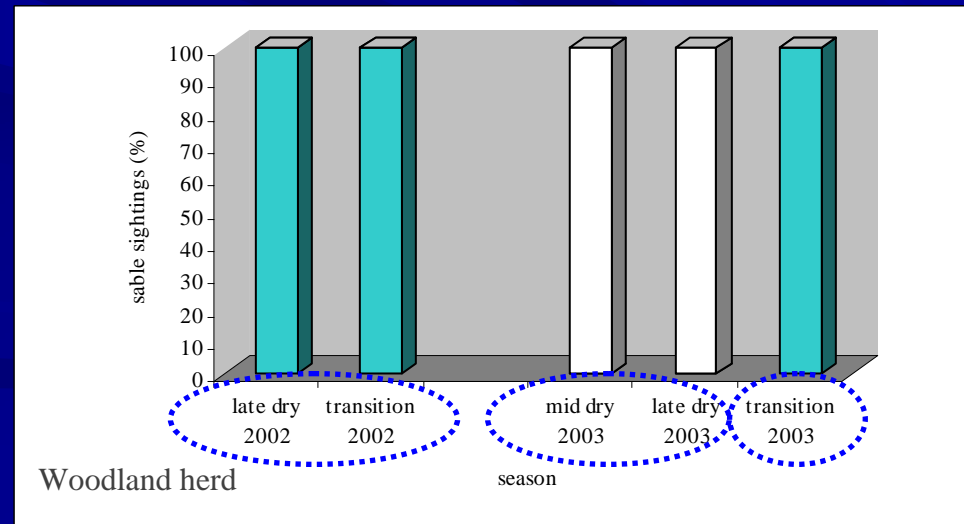
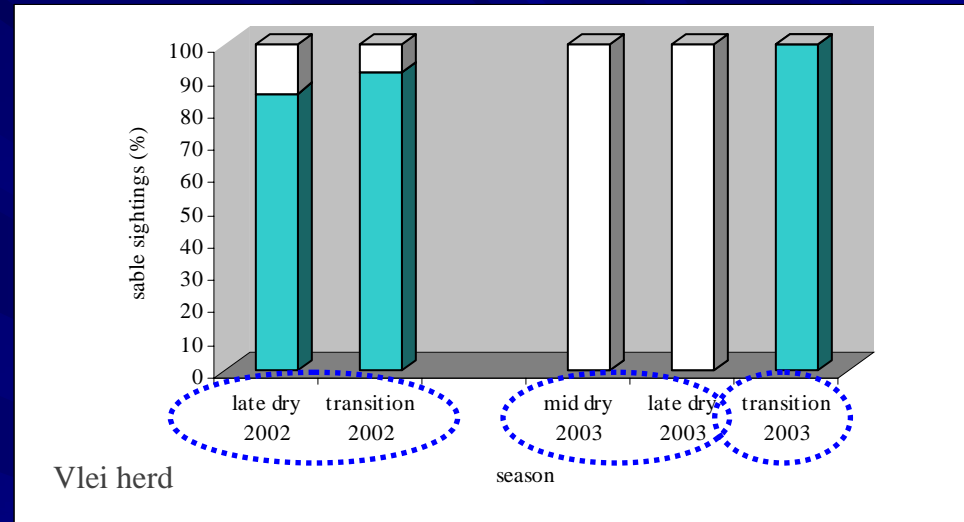
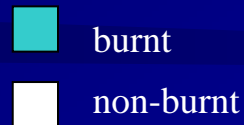
- June 2002
- May 2003





Sable and burnt areas

- Whenever green regrowth occurred in the burnt areas, both herds were feeding extensively in these burnt areas.





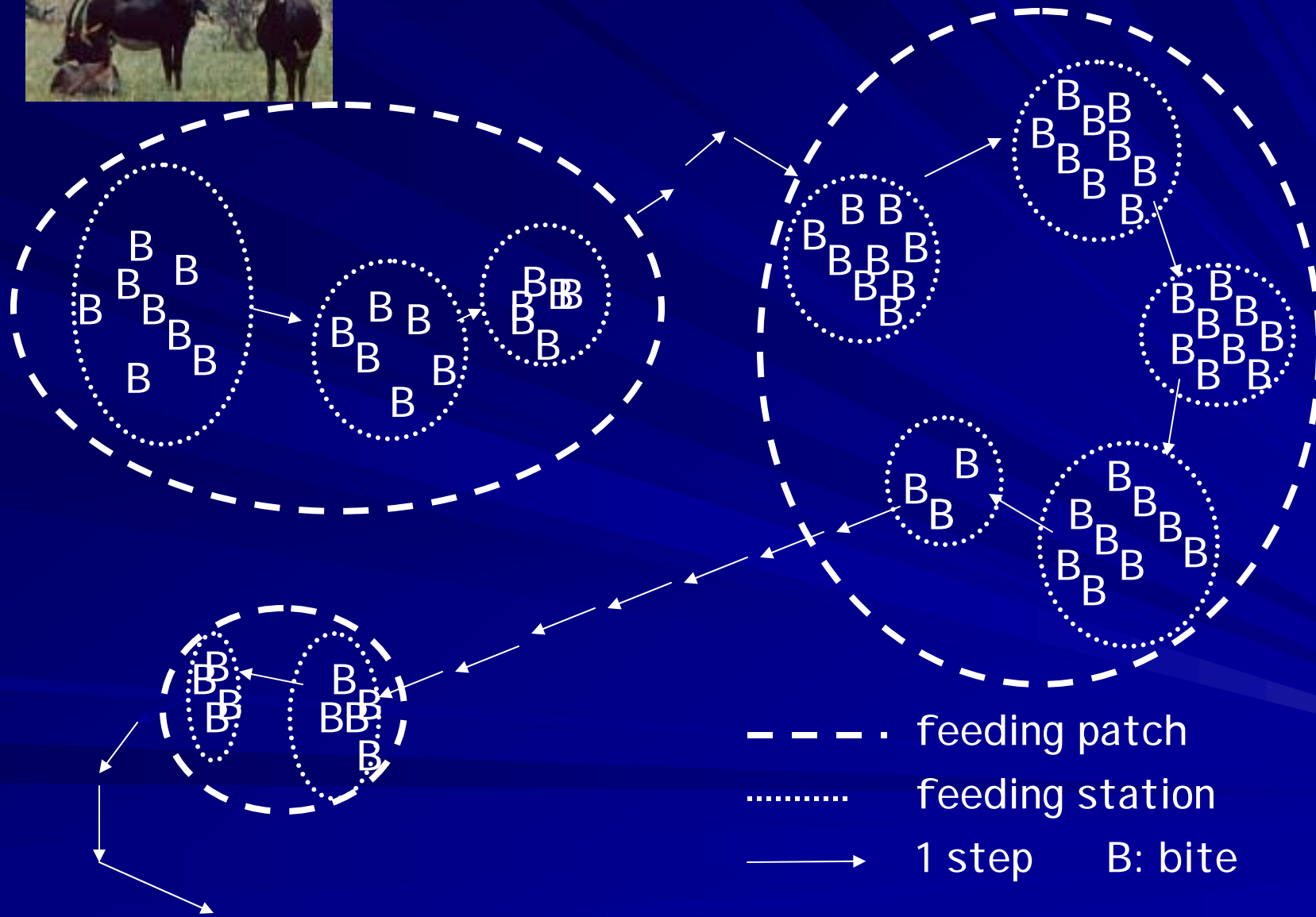
Questions

- Whether the nutritional status of the two herds differed
- How sable responded behaviorally to food quality decrease during the dry season without burns
- How the use of burnt areas influenced faecal nitrogen and phosphorus





Foraging behaviour (1)

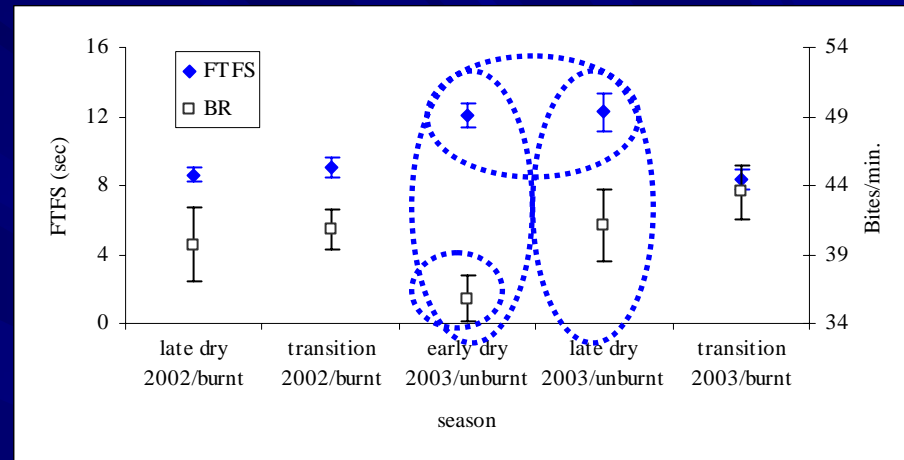




Foraging behaviour (2)

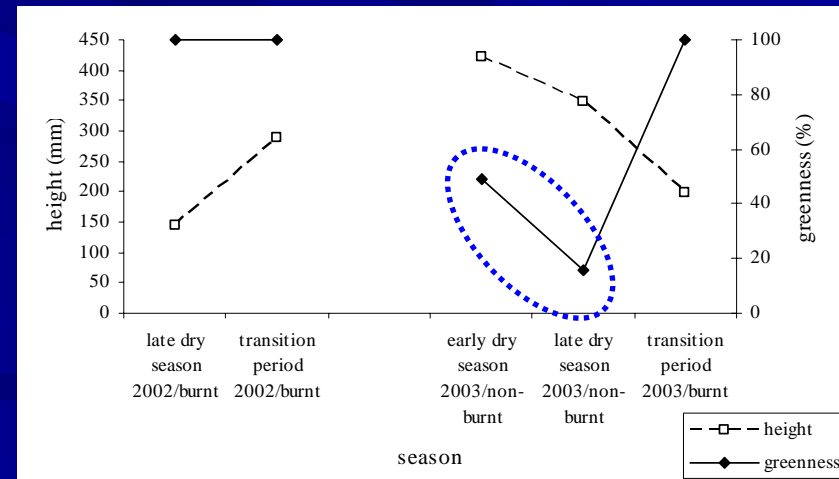
Feeding time per feeding station (FTFS):

- On non-burnt areas > burnt areas.



Bite rate (BR):

- Early dry season on non-burnt areas < all other periods.

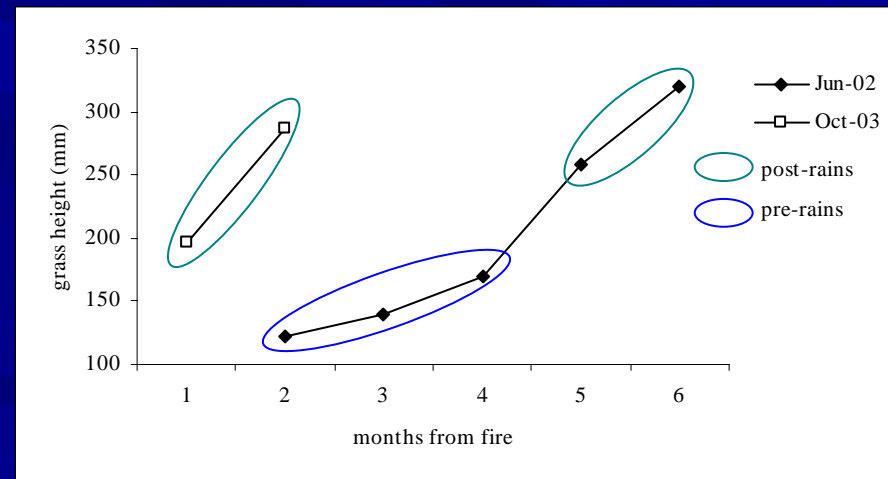
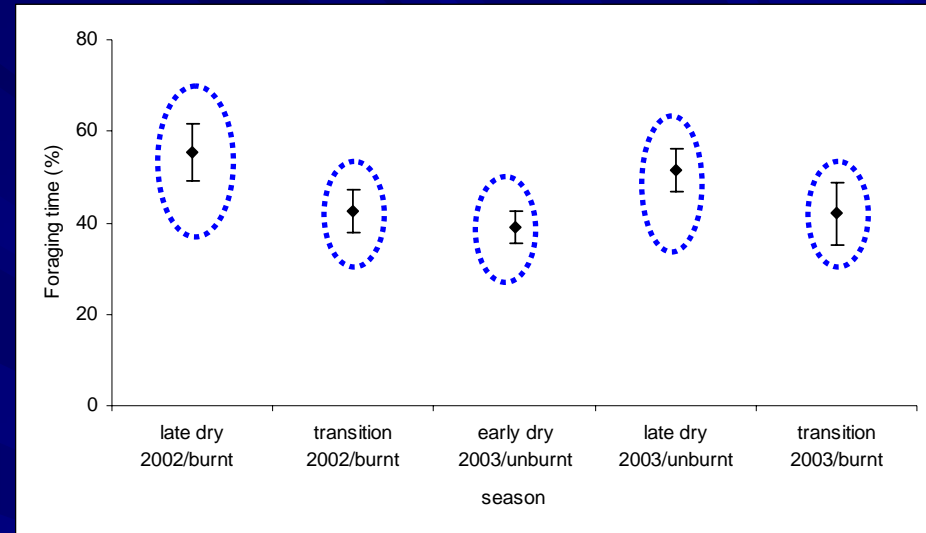




Foraging behaviour (3)

Daily foraging time:

- On non burnt areas, late dry > early dry season.
- On burnt areas, 'pre-rain' burns > 'post-rain' burns.





Foraging behaviour (4)

- The increase in bite rate from early dry to late dry season suggests that sable shifted from a selective feeding strategy to a non selective one as grass greenness declined when burnt areas were not available.
- Sable adapted to the decreased food quality during the dry season by feeding for longer.
- Quantity when feeding on “pre-rain” burns was probably a limitation, but sable were able to adapt by increasing foraging time.

How successfully?

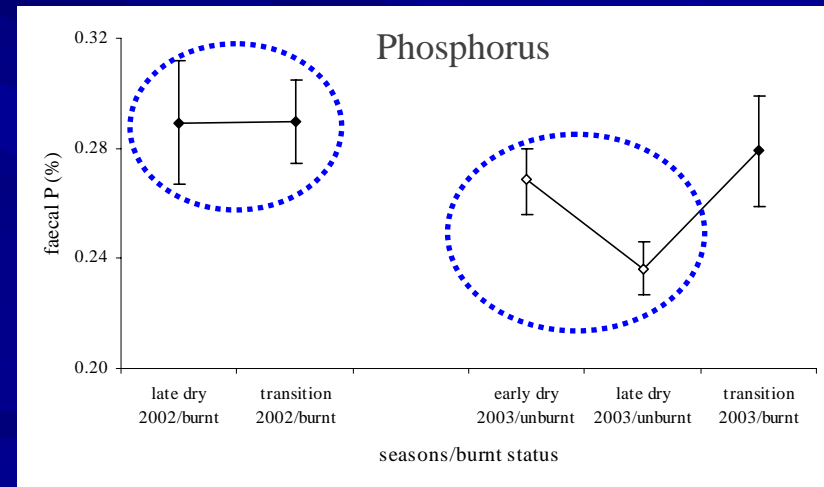
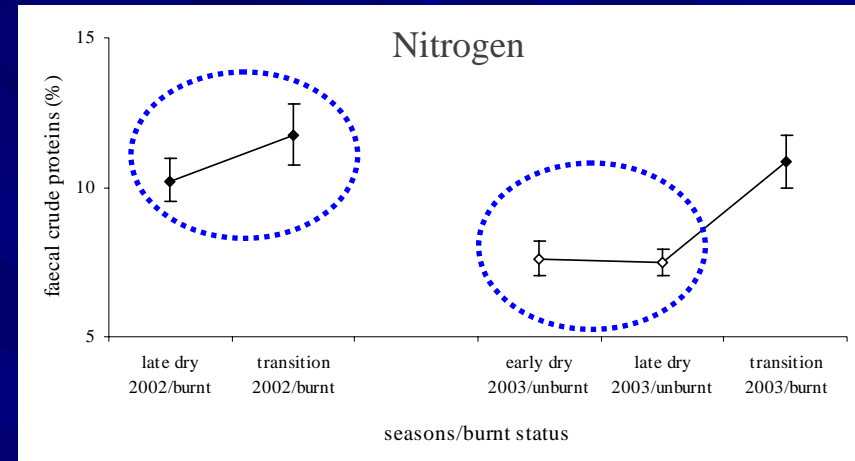




Nutrition

Both **nitrogen** and **phosphorus**:

➤ on burnt areas > than on non-burnt areas, as expected.





Conclusions

Sable were adapting both years:

- Without burns, lowering acceptance levels during the second part of the dry season prevented nutritional status to fall below critical levels... “surviving” but probably more susceptible to predation\diseases\sudden environmental changes.
- With “pre-rain” burns, more successfully despite decreased grass quantity, gaining benefits from the increased quality.
- Burns during the dry season are important in alleviating the nutritional shortfalls during this crucial part of the year, provided green regrowth occurs.





Acknowledgements

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- Kgaswane Mountain Reserve staff provided support during the field work.
- Dr Sander Oom for useful comments during the data analysis and interpretation of results.





KMR and fire (2)

End of October 2003:

- accidental fire
- $\frac{3}{4}$ of the reserve
- just before start of rains





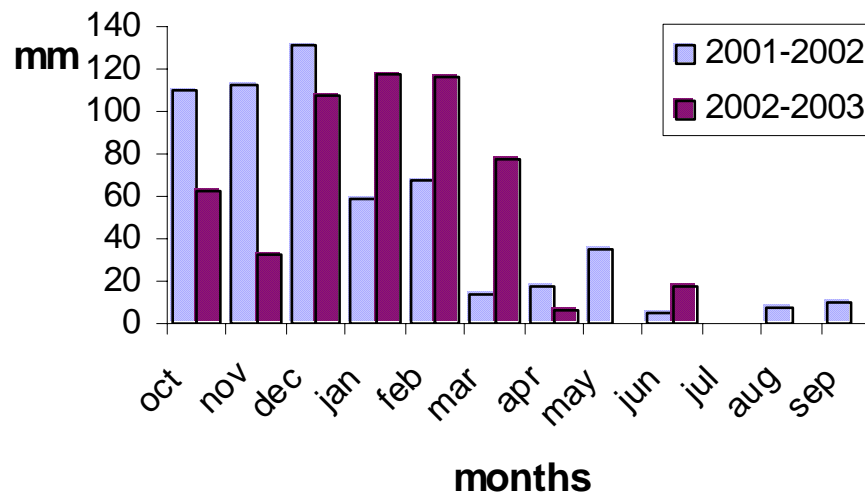
Rainfall

Wet season 2002: 550mm

Wet season 2003: 518mm

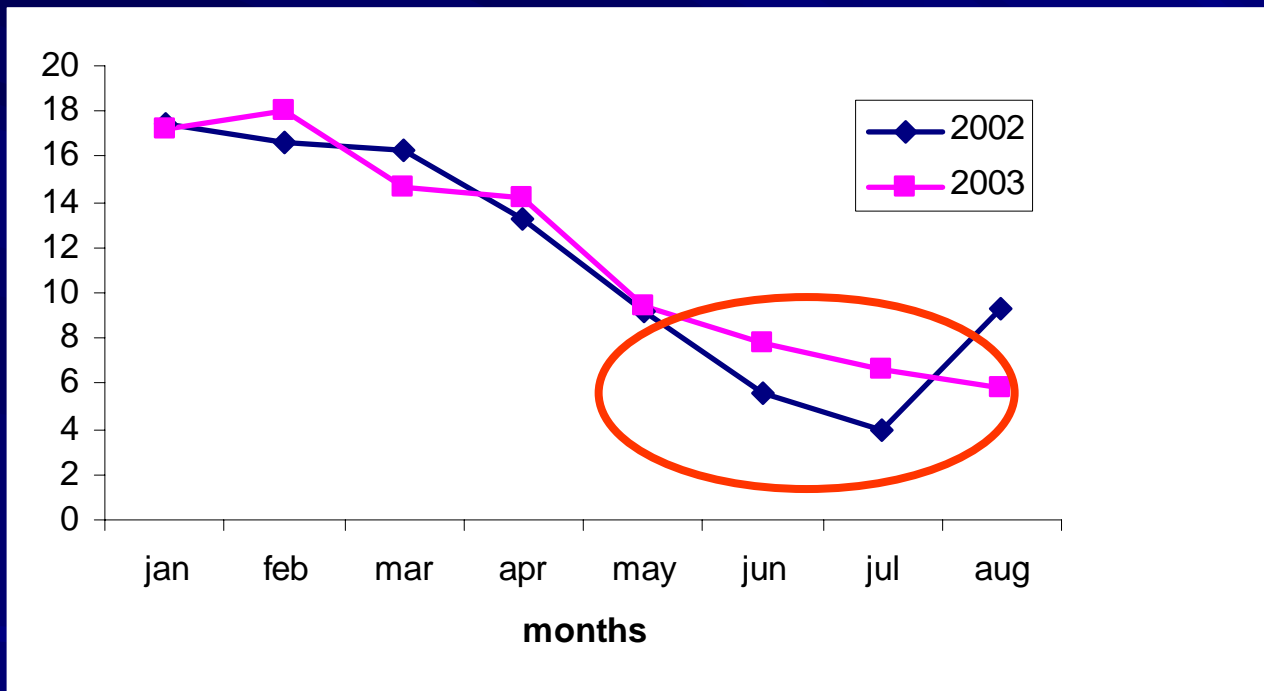
After fire 2002: 28mm

After fire 2003: 17mm





Average monthly minimum temperature



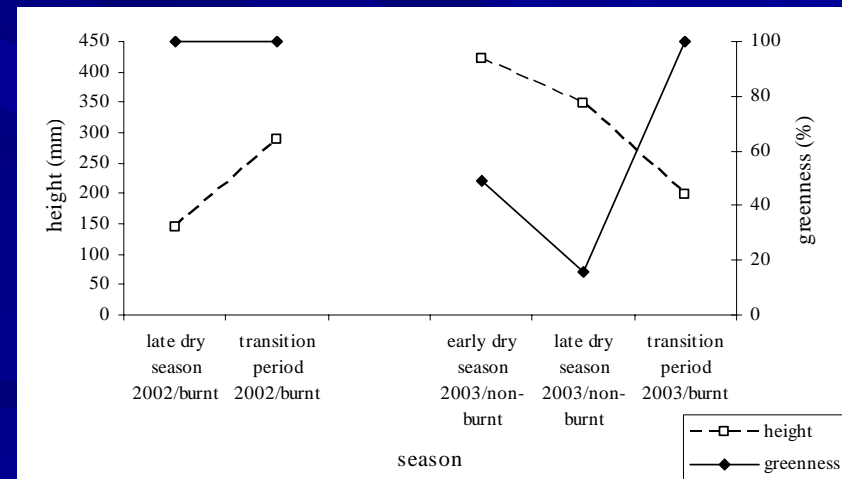
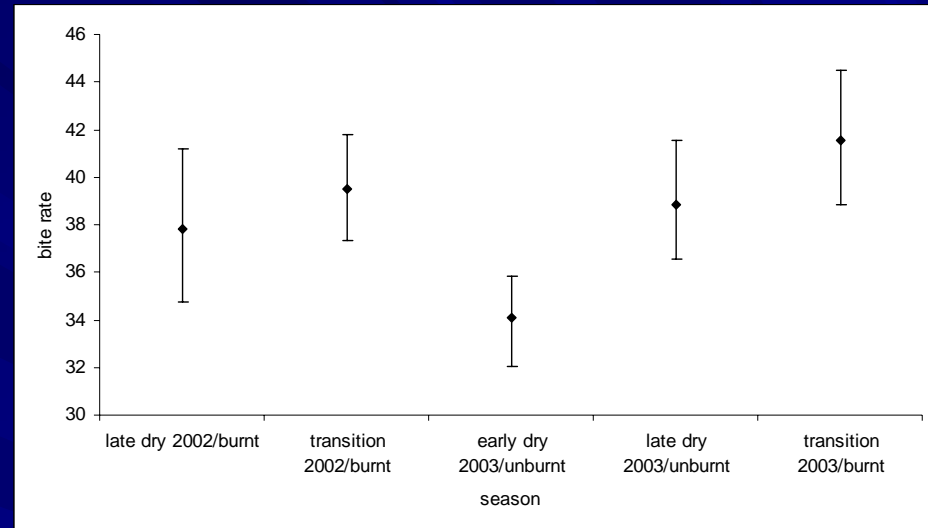


Foraging behaviour (2)

Bite rate:

➤ Late dry 2003 > early dry 2003
 (40.6 ± 1.06 bites/min vs. 35.9 ± 1.04 bites/min, $t=2.29$, $p=0.026$).

➤ Late dry 2003 vs. late dry 2002:
 similar bite rates, differently from what expected ($t=0.53$, $p=0.660$)





Foraging behaviour (1)

Feeding time per feeding station:

➤ late dry 2003 vs. early dry 2003: similar ($t=0.87, p=0.384$)

➤ late dry 2002 < late dry 2003: as expected FTFS is lower on burnt areas (7.03 ± 1.04 sec vs. 12.7 ± 1 .sec, $t=4.14, p=0.0002$)

