

Effects of the nutrient status of the habitat in the wet and dry season on the nutrient status and foraging of roan antelope *Hippotragus equinus* populations in the KNP and Vaalbos National Park, South Africa

by

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under the supervision of

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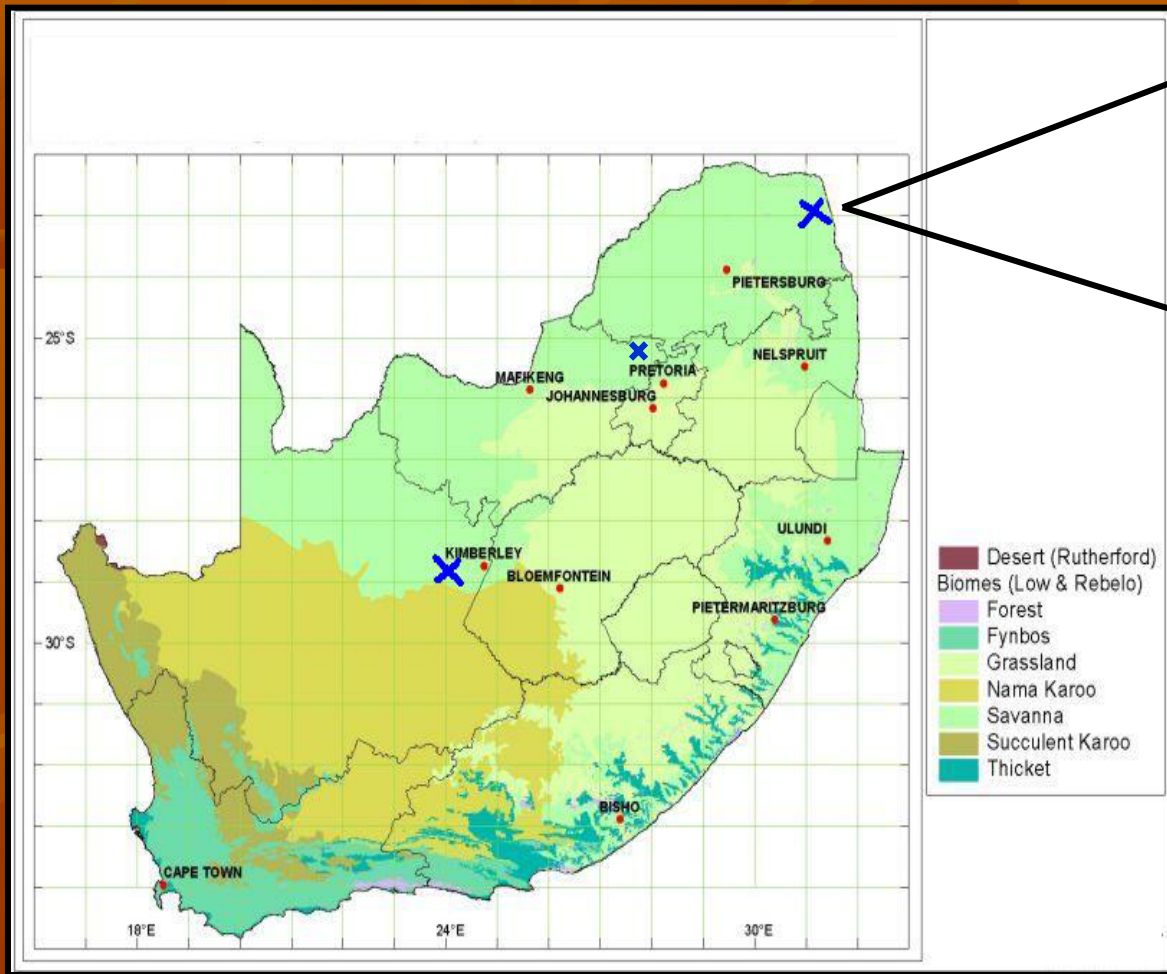
Prof JBJ van Ryssen



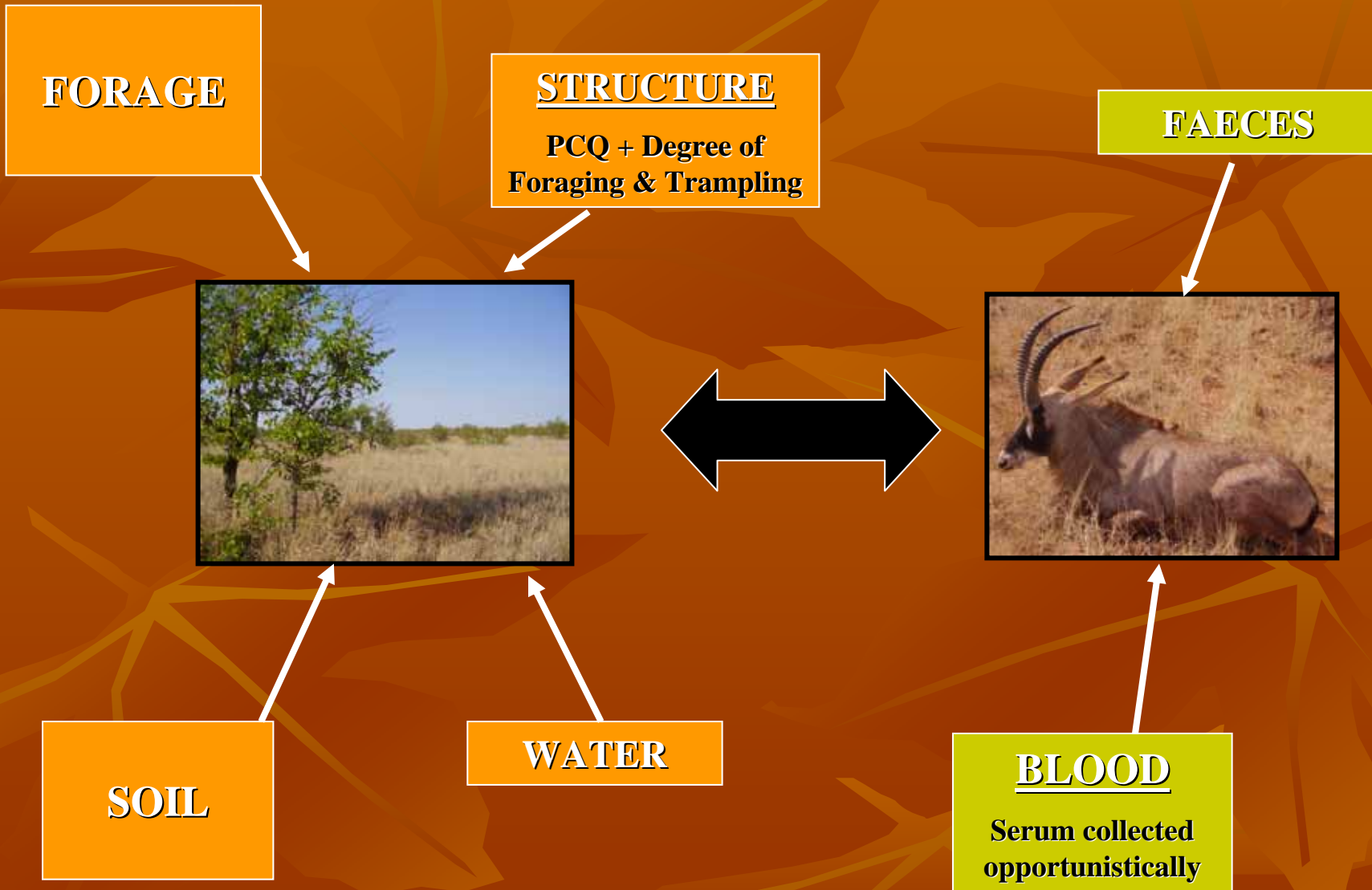
Main Objectives

- Evaluation of habitat use in terms of:
 - Structural composition
 - Nutrient composition
- Evaluation of each roan population's reaction to its habitat structure and quality in order to ID possible limitations / deficiencies
- Comparisons of nutrient status between populations as well as species and sexes

Study areas



Approach & Methods



Seasonal utilisation in KNP enclosures

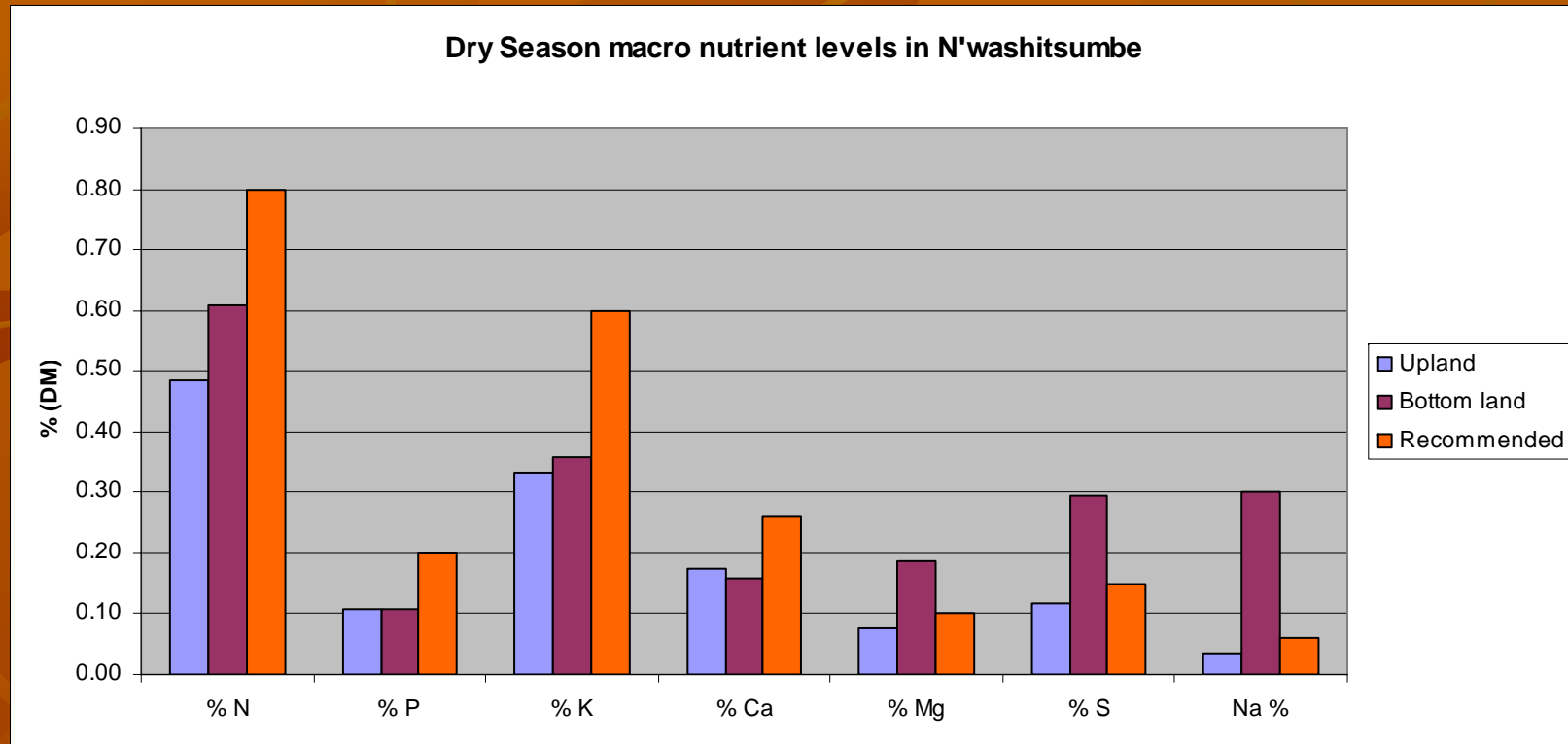
■ DRY season:

- N'washitsumbe – preference to open wetland. Increased use of upland as winter progresses (Knoop & Owen-Smith 2004 (unpublished data))
- Capricorn – unknown

■ WET season:

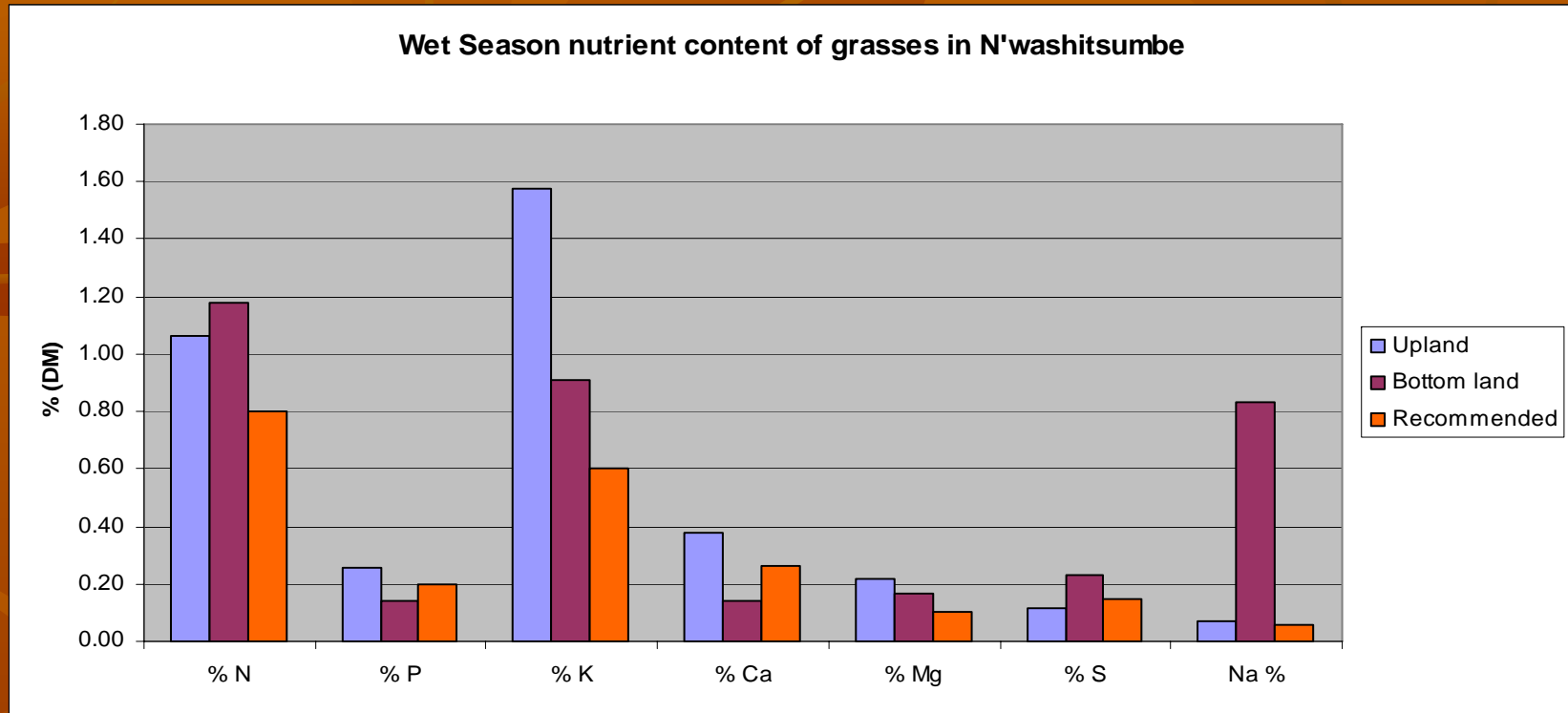
- N'washitsumbe – Preference to upland areas – *foraging* especially between denser mopani's and *resting* in the Marula veld
- Capricorn – Preference to areas with higher tree density even though habitat is much more homogenous

Dry season foraging in N'washitsumbe



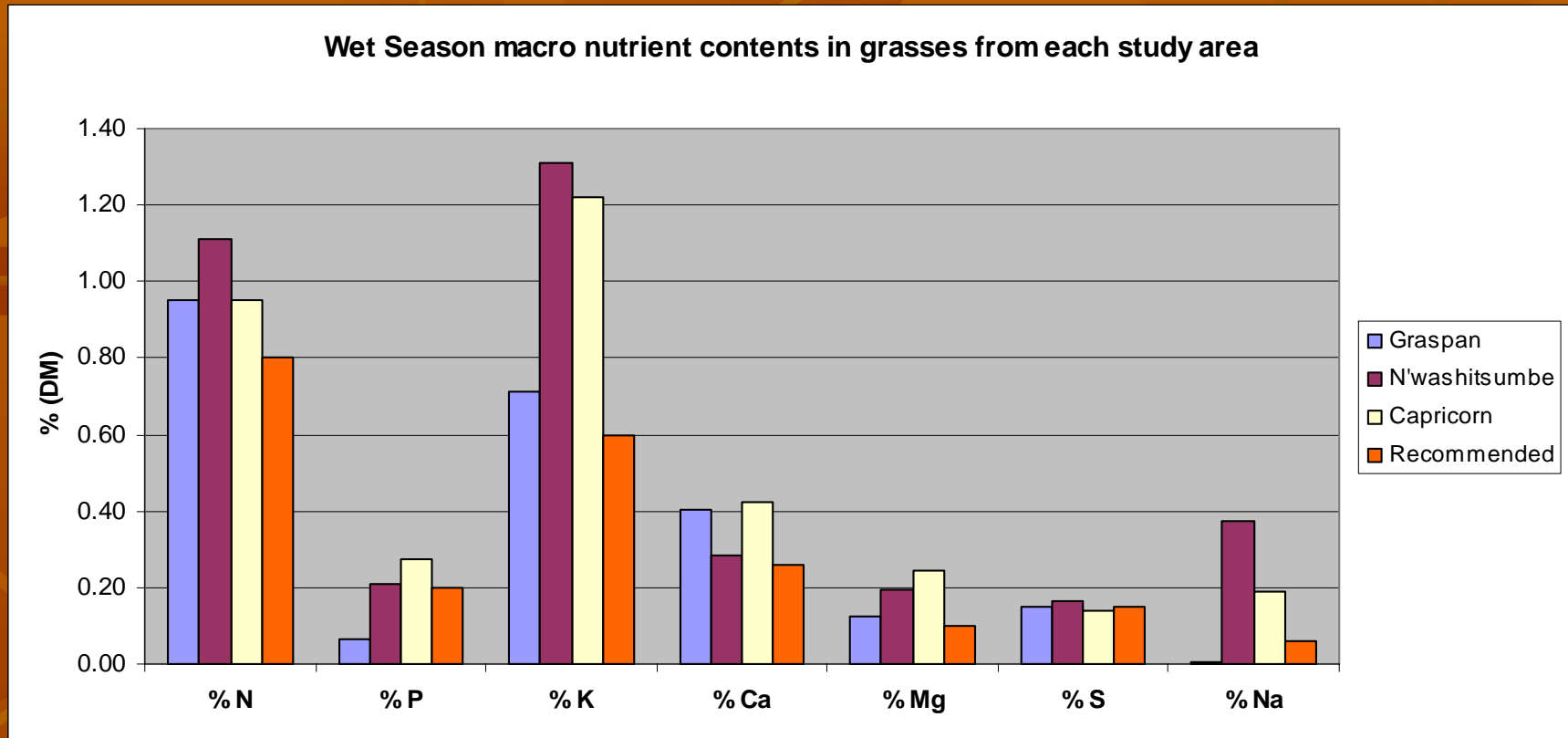
- Roan tend to prefer the bottom land but utilised upland grasses as winter progressed (Knoop & Owen-Smith 2004 – unpublished data)
- Bottomland grasses slightly higher in N (mostly sodic site)
- P, K and Ca as well as micro minerals were very similar.
- ***Bottom land grasses significantly higher in % Mg, S and Na – only nutrients with sufficient concentrations***

Wet Season foraging in N'washitsumbe



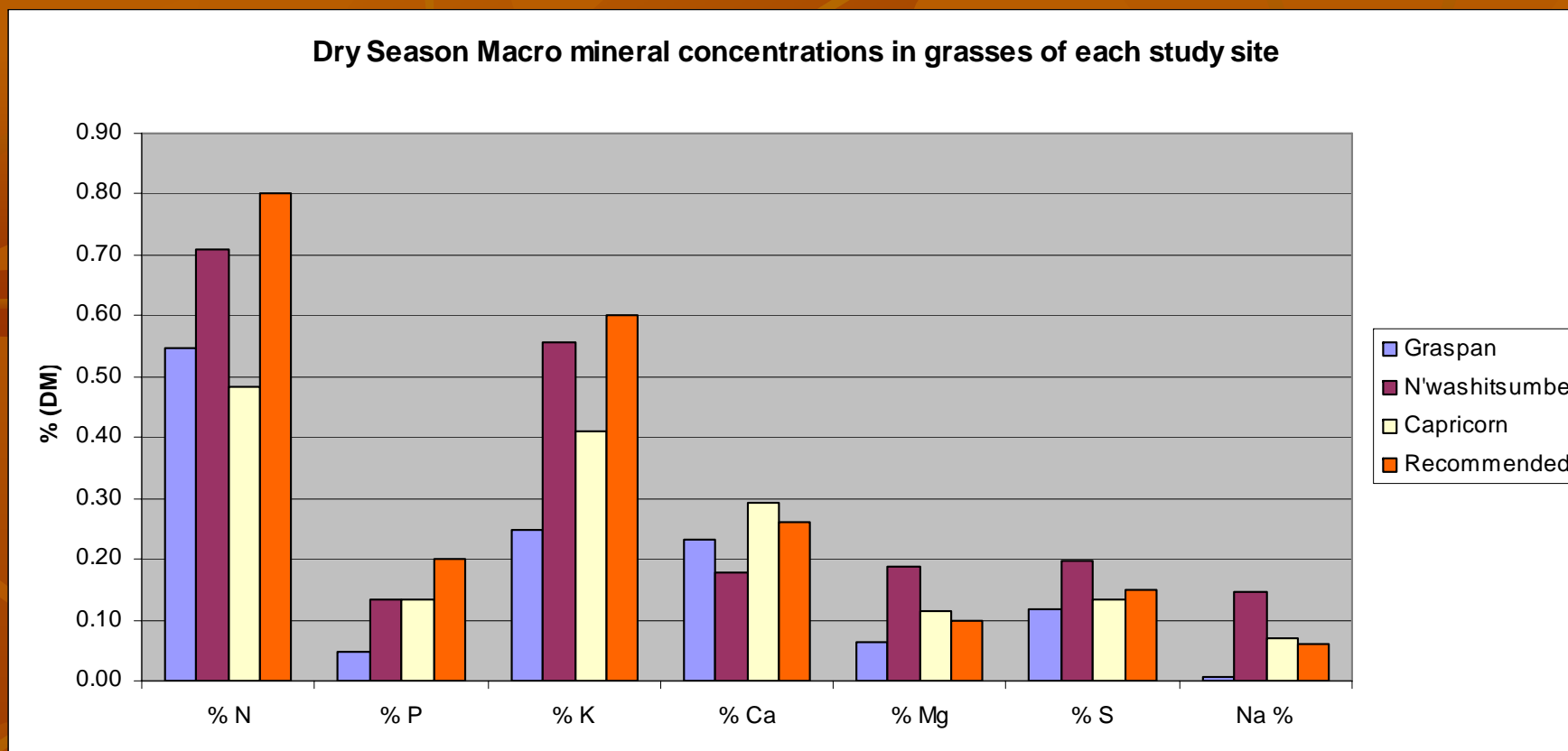
- Roan tend to prefer the upland, especially areas with higher tree density (mopani's)
- Upland grasses higher in P, K, Ca and Mg
- Bottom land grasses higher in S and Na
- Micro nutrients within recommended requirements
- *P and Ca in bottom land grasses below recommended levels*

General forage nutrient status – wet season



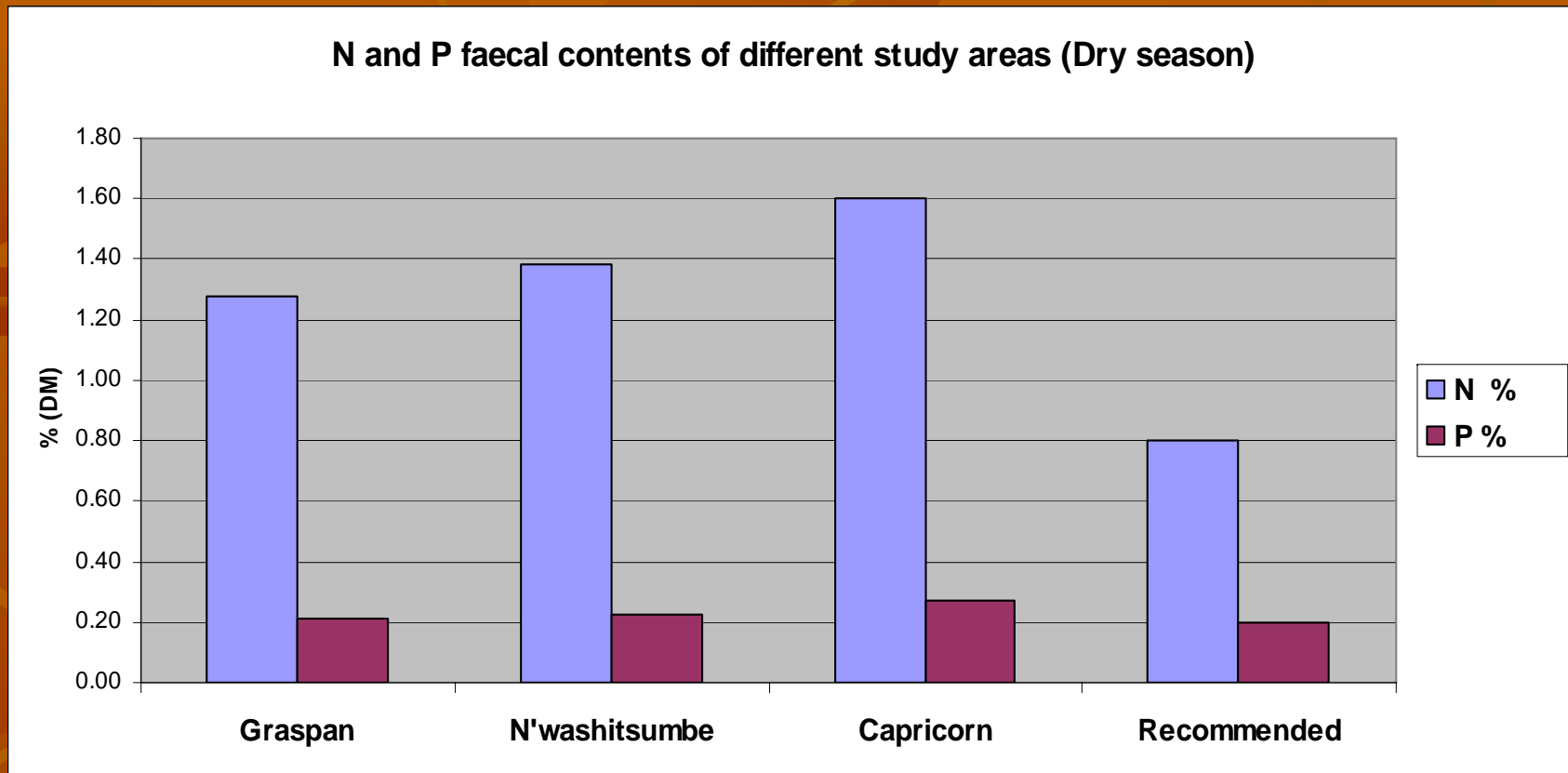
- Most nutrients sufficient except Graspan P & Na concentrations.
- *Faecal P levels in Graspan was, however sufficient*

General forage nutrient status – Dry season



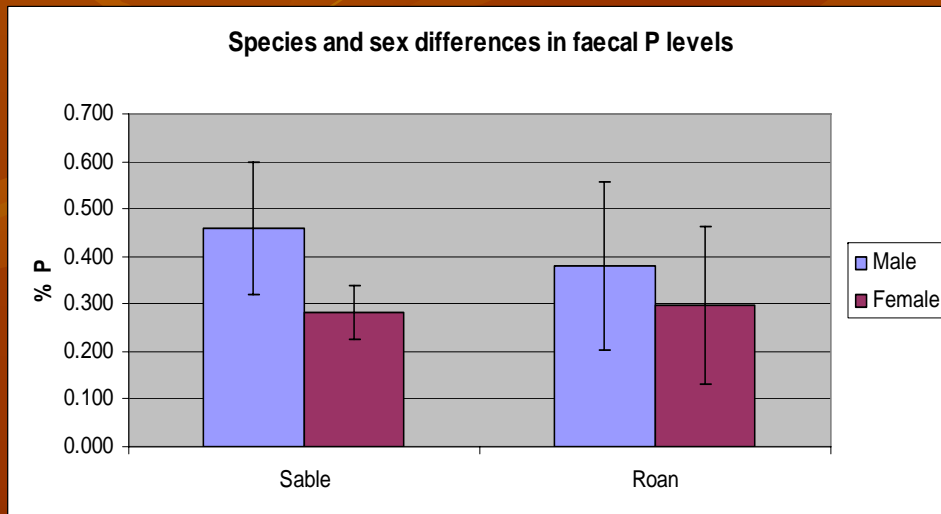
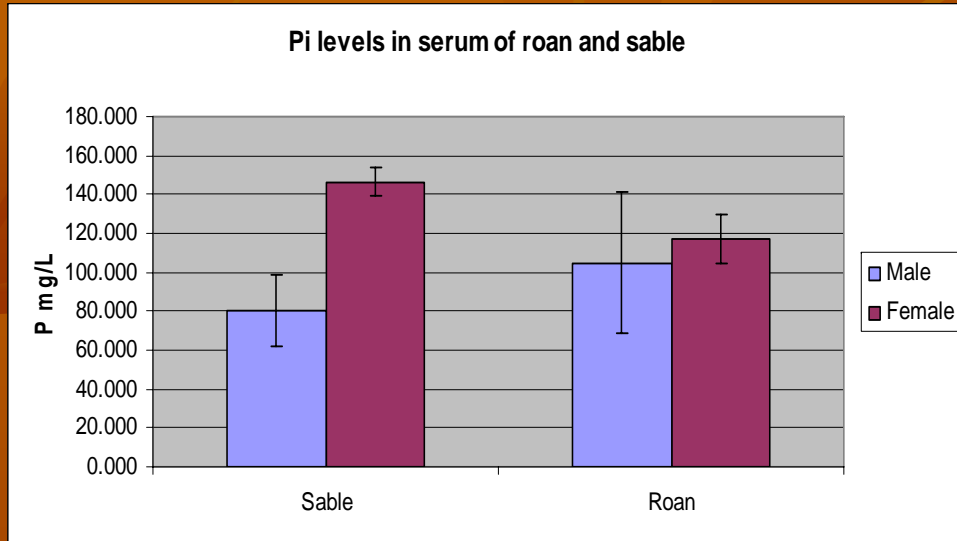
- Capricorn generally lower concentrations than N'washitsumbe, accept Ca
- N, P, K, Ca and S deficient in most areas
- Ca:P ratios were acceptable in all areas, despite deficiencies

N & P faecal concentration – Dry season



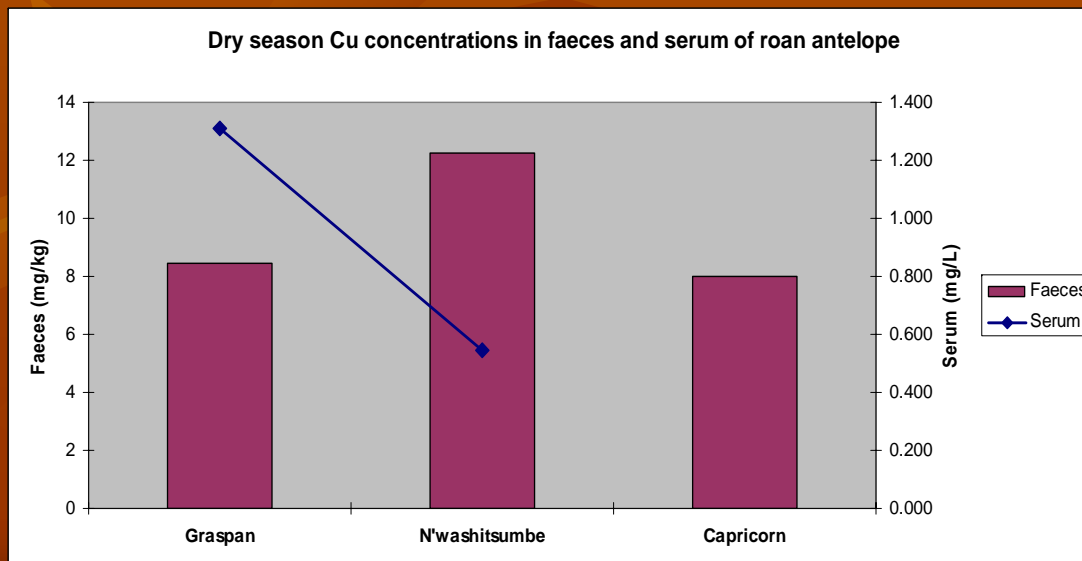
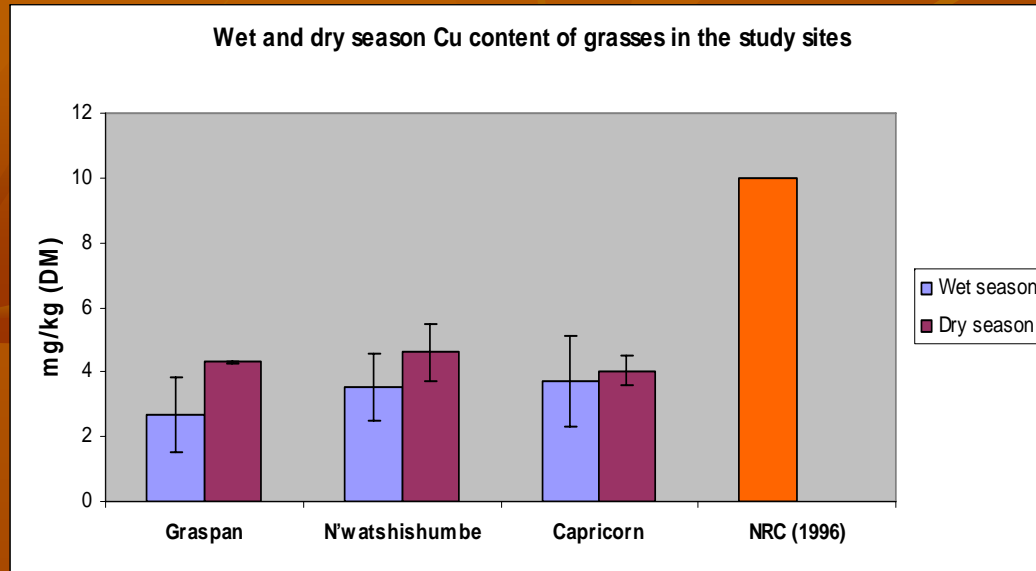
- Despite deficient levels in grasses, faecal N and P in all the study areas were acceptable
- *Pi levels in serum of Graspan roan bulls also normal*

Species and Sex differences in Phosphorus



- Significant species differences in *serum* in both sexes
- Significant sex differences within each species (*serum & faeces*), except serum in roan
- No significant species differences in *faeces*
- Females mobilise and utilise more P and therefore excrete less

Cu concentration in forages of different study areas



- Cu was most deficient micro nutrient
- Cu:Mo ratios were acceptable
- Faecal Cu excretion the highest in N'wathsumbe most probably due to higher Sulphur winter grasses
- Serum samples from N'wathsumbe indicated marginal Cu levels
- Graspan Cu serum content was marginal to sufficient

Conclusions

- Roan in small enclosures, in the absence of predators seems to disregard habitat structure when foraging – *Is it due to food shortages or zero predators?*
- Free roaming roans tend to prefer open savanna areas (Joubert 1976) – *is this because of predator evasive behaviour??*
- If free roaming roan antelope are not utilising denser areas with higher habitat quality during specific times of the year, due to *antipredator behaviour*, the cost thereof could increase individual vulnerability during specific times – especially nursing females & calves – *Effect of bush encroachment...*
- This implies that the breeding of roan in absence of predators for release back into the park could be fatal to newly released animals because of zero predator evasion behaviour – *will continue to graze in dense areas where visibility is low*
- Results indicate that roan antelope could extract sufficient nutrients from seemingly deficient habitat, either through *selection* or *physiological* adaptations
- Data indicate that, during critical periods of the year, females in peak production could be nutrient deficient, especially in terms of N, P and Cu – *Roan breed throughout the year*
- Data suggest that the nutrient status of free ranging herbivores can best be evaluated when forages, faeces and blood samples are collected and analysed for the full mineral spectrum in order to explain possible nutrient interactions

Thank you!

