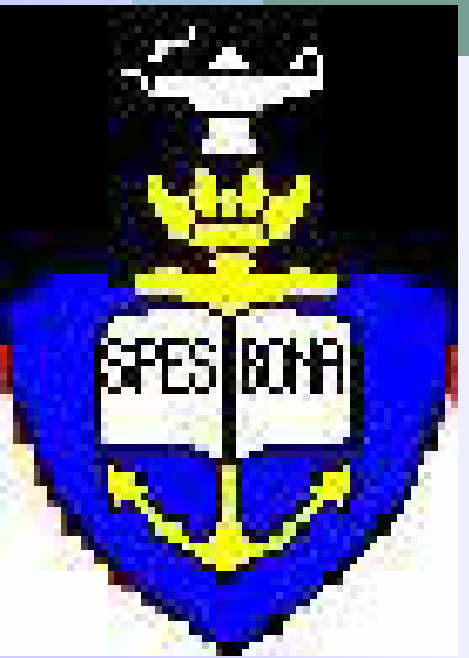


# PRODUCTIVITY AND CARRYOVER AMONG MESIC AND SEMI-ARID GRASSLANDS

*Masubelele ML, Bond WJ & Stock WD*



**Zululand Grass Project**



# Introduction

- Productivity has been linked to rainfall, herbivory and soil properties
- but little is known about how productivity is related to carryover
- Semi-arid grasslands seems to experience a long dry sunny winter and hence no or little carryover while the mesic grasslands on the other hand seems to accumulate necromass

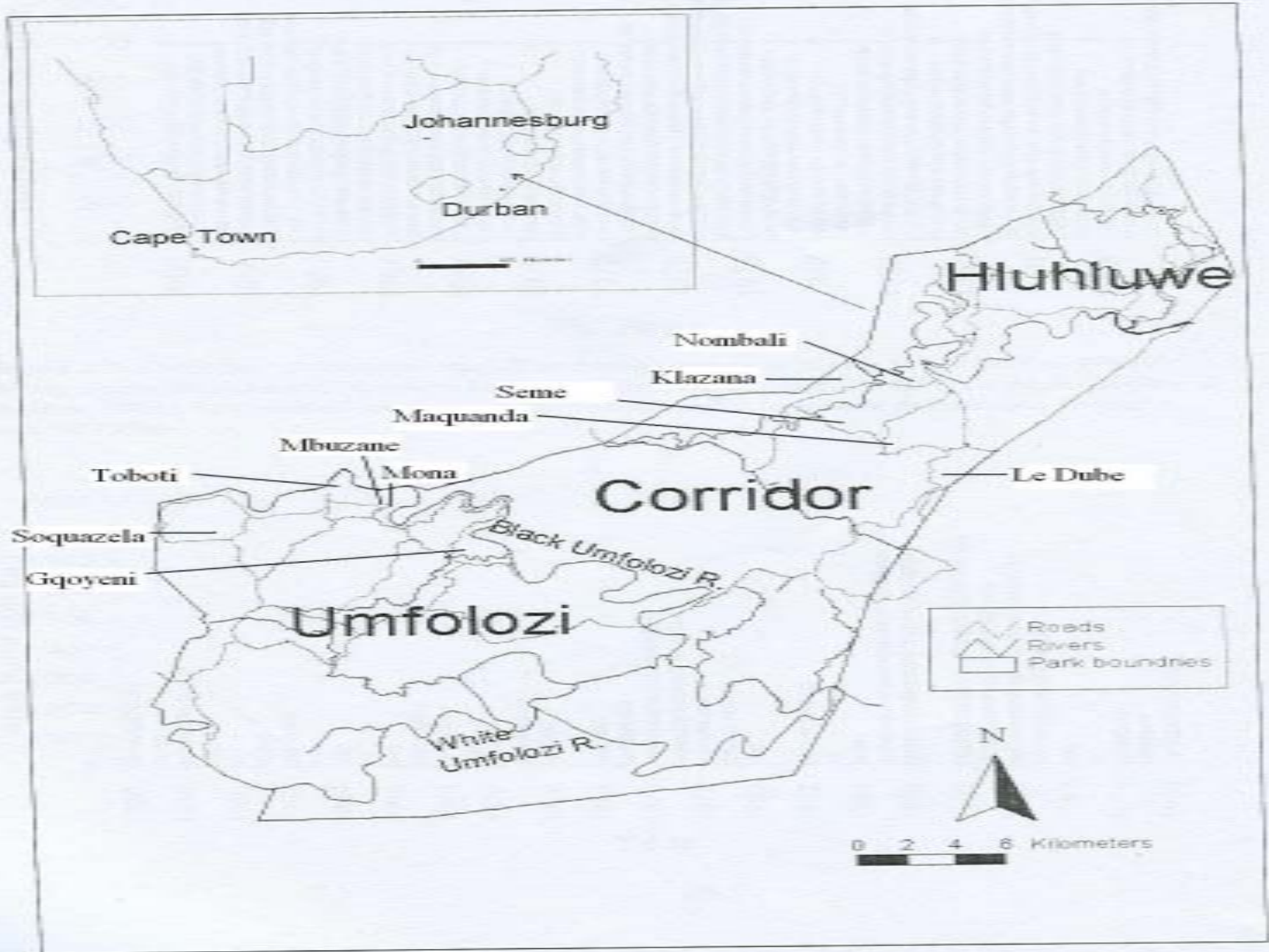


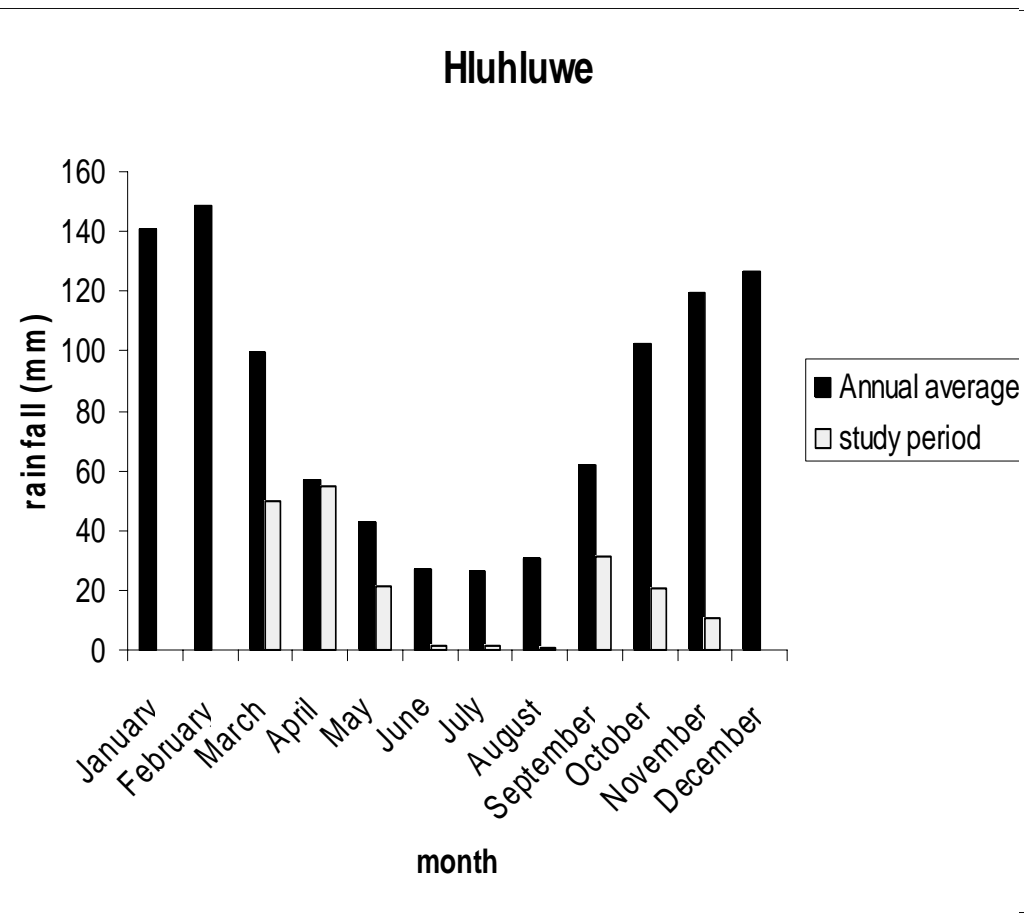
# Aims

- To determine if there is a relationship between productivity and carryover
- To determine how the two processes varied among mesic and semi-arid grasslands
- To establish the determinants of productivity and litter carryover between mesic and semi-arid grasslands in the presence or absence of large herbivores

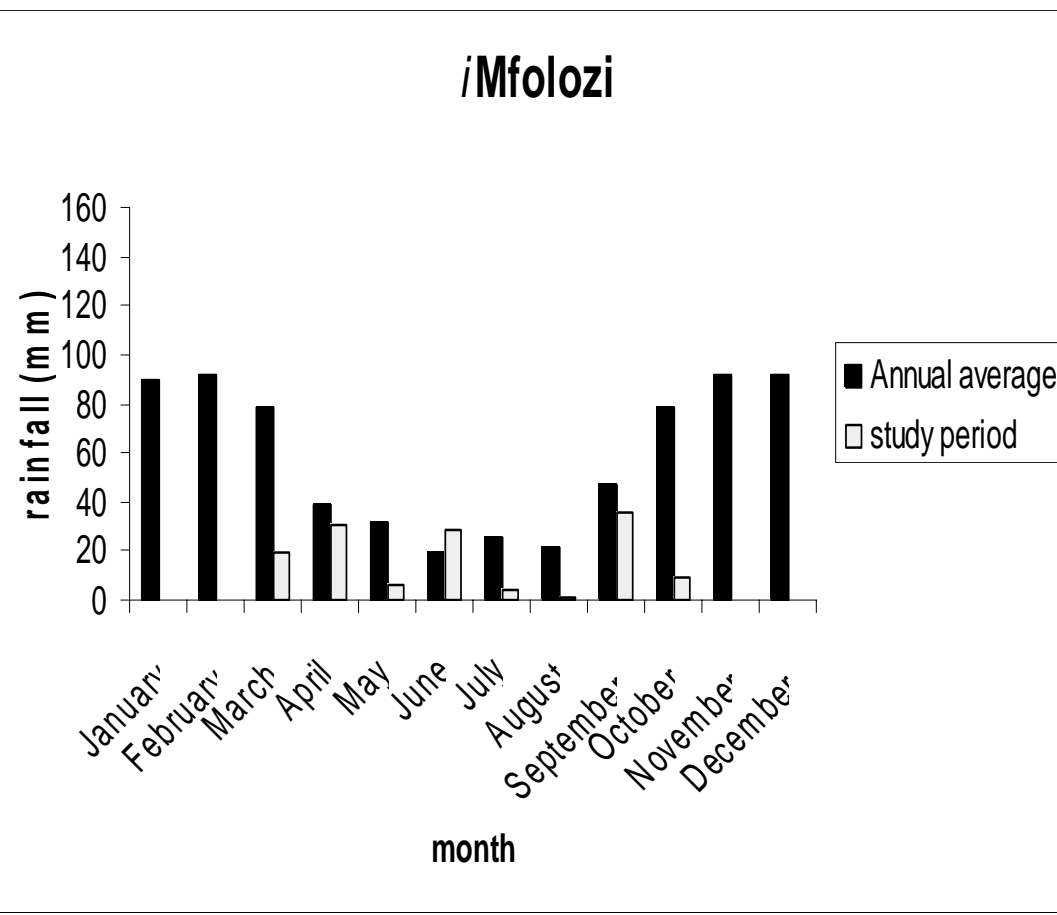


# Study Area





**Figure 3.2:** The average rainfall data collected at Hluhluwe Park based on an annual data collection for the 71 years. The study period was from May to October 2003



**Figure 3.1:** The average rainfall data collected at iMfolozi Park based on an annual data collection for the 71 years. The study period was from May to October 2003.

# Results Part 1A

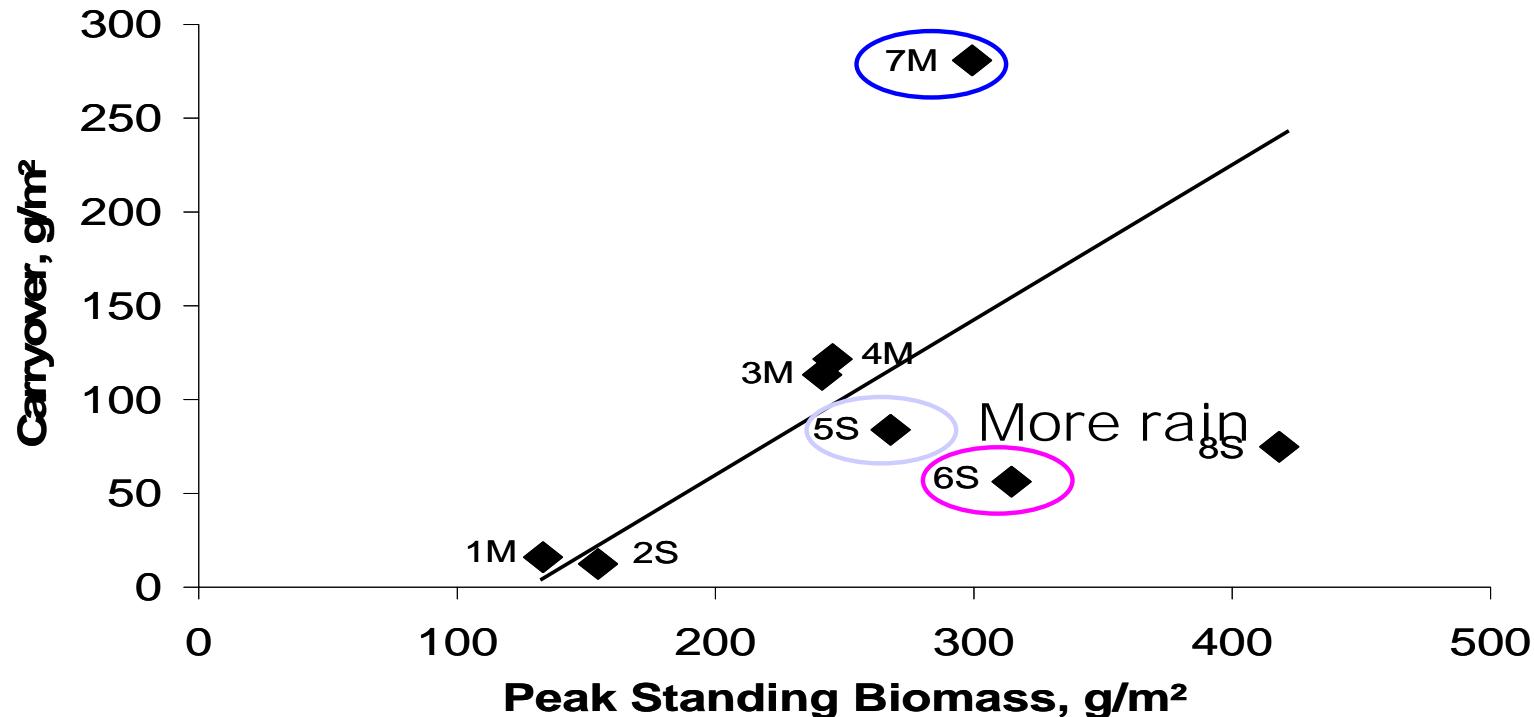


Figure 2.7B: The relationship between carryover after first rain versus peak standing grass biomass during the June-November 2003 dry season. Sites are: 1, Klazana; 2, Mona; 3, Seme; 4, Maquanda; 5, Soquazela; 6, Mbuzane; 7, Nombali; and 8, Toboti. Data points with symbol M is for mesic savanna whereas S is for semi-arid savanna.

# Results Part 1B

**Table 2.1B Results of an ANOVA on the potential determinants of variation in the peak standing biomass harvested using log transformed data. Park= mesic vs. semi-arid. Homogeneity tests showed that  $p > 0.05$ . DF= degrees of freedom**

Predictor	DF	Sum of Squares	F Ratio	Prob>F
Park	1	0.043	0.74	0.39
Site (Park)	8	1.117	2.42	0.03

**Table 2.2B Results of an ANOVA on the potential determinants of variation in carryover using log transformed data. Park= mesic vs. semi-arid. Homogeneity tests showed that  $p > 0.15$ . DF= degrees of freedom**

Predictor	DF	Sum of Squares	F Ratio	Prob>F
Park	1	1.09	9.52	0.00
Site (Park)	6	5.21	7.60	0.00

# Results

**Table 2.3B Results of an ANOVA on the potential determinants of variation in the peak standing biomass harvested using log transformed DPM averages. Park= mesic vs. semi-arid. Treatment= control vs. hare fence. Homogeneity tests showed that  $p > 0.05$ . DF= degrees of freedom**

Predictor	DF	Sum of Squares	F Ratio	Prob>F
Park	1	0.04	0.58	0.45
Site (Park)	1	3.85	6.93	0.00
Treatment	6	11.7	168	0.00

# Conclusions

- Productivity mesic=semi-arid grasslands in -large herbivores
- High grass productivity in mesic grasslands results in high carryover while it was not necessarily the case for semi-arid grasslands
- Mesic grassland differed from semi-arid grasslands in litter disappearance



# Conclusions

- Species composition governed the differences in carryover among mesic and semi-arid grasslands
- large herbivores reduces productivity, and hence carryover





# Implications for Biodiversity

- Mesic grasslands are less diverse than semi-arid grasslands due to the high carryover in this grasslands
- Few species stands of moribund grasses in mesic will prompt less soil biodiversity than variety of species experienced in semi-arid grasslands, and hence slow decomposition rates in mesic

# Acknowledgements

Many thanks to William, Willy, Dawood, Claudius, Joe Craine, Botany Department and the NRF for support  
ZLGP staff especially Krissie and Eric

