

University of Hohenheim
Institute of Plant Production and Agroecology
in the Tropics and Subtropics
Department of Agroecology in the Tropics and Subtropics

Prof. Dr. Joachim Sauerborn

Dr. Anna C. Treydte



Comparing mono-specific and multi-species
mammalian herbivory in a South African savanna

Diploma Thesis

submitted by

Sabine Anne Angela Katrin Baumgartner

Stuttgart – Hohenheim

March 2012

*This work was financially supported by the
Foundation fiat panis.*

Abstract

A large and rapidly growing part of the human world population is heavily relying on savanna ecosystem services for livelihood. Mammalian herbivory is one of the major factors regulating savanna ecosystems. However, research quantifying and comparing the impact of different domestic and wild mammalian herbivore assemblages and their densities on the vegetation is rare. The buffalo enclosure inside Kruger National Park (KNP) and communal grazing lands of the Mnisi area adjacent to KNP provided ideal conditions to assess the vegetation under multi-species and mono-specific herbivory in a close-to-natural savanna system versus communal grazing land. We studied the herbivores' impact on species composition and structure of the herbaceous and woody vegetation. Additionally, grass quality and soil properties were analysed to understand the role of herbivore densities and assemblage types.

We found that herbaceous species richness was higher on communal farmlands compared to protected areas inside Kruger Park, as was forb cover. The lowest Shannon Wiener diversity index was found under mono-specific grazing at wildlife and livestock sites. Grass leaf nutrient content was significantly higher and annual grass species were less abundant under multi-species wildlife and livestock herbivory. Inside KNP, the mono-specific site showed the highest density of bushes and small trees. In contrast, bush density at the livestock sites was found to be higher under multi-species herbivory, whereas small tree density was significantly lower there.

Our research showed that multi-species herbivory decreased pressure on herbaceous vegetation, enhanced biodiversity and improved grass quality. Bush and small tree growth could efficiently be suppressed by multi-species herbivory. We conclude that multi-species herbivory is of importance for the balance between woody and herbaceous cover in savanna systems and that herbivore biodiversity plays a major role in ecosystem functioning.

Key words Savanna, biodiversity, herbivore assemblage, herbaceous community, bush encroachment