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## Mammalian Herbivores as Designers of African Savannah Ecosystems

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### Abstract

African savannahs support a large proportion of the world's human population, heavily relying on resources provided by an intact savannah. Mammalian herbivory is one of the major factors regulating savannah ecosystems. However, research quantifying and comparing the impact of domestic and wild mammalian herbivore assemblages and their densities on the vegetation is rare. In the Kruger National Park (KNP) and adjacent communal grazing lands we assessed the vegetation under different grazing and browsing regimes in a close-to-natural savannah versus communal grazing land. We studied woody plant species composition and structure under browser presence and absence. We additionally analysed herbaceous vegetation and soil properties to understand the role of grazer 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 with 311 trees ha<sup>-1</sup> and 140 trees ha<sup>-1</sup> 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 certain grass species were strongly resistant against high mono-specific grazing pressure. Multi-species herbivory in contrast decreased pressure on herbaceous vegetation, enhanced biodiversity and improved grass quality. Bush and small tree growth could efficiently be suppressed by multi-species herbivory. Different herbivore assemblages show strong impacts on vegetation and soil conditions, thus, play an important role as designers of savannah ecosystems.

**Keywords:** Biodiversity, bush encroachment, herbaceous community, herbivore assemblage, savannah