

Spatial variability of herbage yield, grazing capacity and plant diversity in a tropical savannah rangeland ecosystem

Abstract

To improve ruminant livestock production, evaluation of rangelands must be a routine. Rangeland evaluation gives information about the vegetation structure, biomass yield and quality. The Guinea savannah rangelands of Ghana lack research that characterises the spatial variability of herbage yield and quality. It was hypothesised that there is spatial heterogeneity in herbage yield, grazing capacity and plant diversity in the Guinea savannah rangelands of Ghana. The objective was to evaluate the spatial structure of herbage production and grazing capacity in the Guinea savannah rangelands of Ghana for sustainable livestock production. Data were collected from 105 sampling sites and integrated into geo-statistics, using ordinary kriging interpolation to generate herbage yield and grazing capacity estimates. Herbage yield and grazing capacity ranged from 0.63 t ha⁻¹ to 13.43 t ha⁻¹ and 0.18 LU ha⁻¹ to 3.79 LU ha⁻¹ respectively. The root mean square error and the average standard error values were close (2.38 and 2.51 respectively for herbage yield and 0.67 and 0.71 respectively for grazing capacity). Species diversity using the Shannon's index ranged from 1.13 to 2.40. There was spatial heterogeneity in herbage yield, grazing capacity and species diversity in Ghana's Guinea savannah rangelands with some parts needing effective site-specific improvement strategies for sustainable livestock production.