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Ecological factors influencing large herbivore distribution in Ruma National Park of Homabay County, Kenya

ABSTRACT

Understanding ecological factors influencing large grazing herbivores distribution (LHD) in terrestrial ecosystems is a fundamental goal of ecology. However, herbivores are distributed in areas where they can maximize their energy gains within the natural constraints imposed by biotic and abiotic factors. Studies have shown that ecological factors variably influence LHD in savannah ecosystems. However, in Ruma National Park no research has been done to establish ecological factors that influence LHD in spite being a fragile fragmented ecosystem. The specific objectives were to: determine influence of grass biomass on LHD; assess relationship between grass species richness (GSR) and LHD; find out effect of altitude and water sources on LHD and determine the influence of mean monthly rainfall on LHD. This study adopted cross-sectional correlational, experimental and longitudinal research design. The study area was stratified into escarpment, riverine forest and wooded grassland using contours. Systematic sampling was done to get biomass sample plots by dividing the Park into $1km^2$ grids, oriented transects south East to North west across the strata, purposely selected the first plot and got the next plot on 3km along the transect with 6, 12 and 18 plots respectively. Grass was clipped from 4 randomly selected quadrants in every $1km^2$ in the 9 grids and air dried to constant weight for biomass estimation. GSR was visually counted from the subplots. Mean monthly rainfall emanated from Ruma weather stations for analysis. Contours were used for stratification and sample plot locations and altitudes were georeferenced using a GPS. Quantitative data were analyzed using least squares linear regression and multiple regressions. Results were presented in tables, scatter graphs and maps. Results show that mean grass biomass in Ruma National Park varied from $163g/m^2$ to $1940g/m^2$. The relationship (R^2=0.83, P=0.0001), indicated that 83% of the variation on LHD was accounted for by grass biomass. Positive associated (R^2=0.66, P=0.0001), demonstrated that 66% of the variation on LHD was explained by GSR with *Themedatriandra* being abundant. Mean monthly rainfall (R^2=0.51, P=0.001) explained 51% of the variation on LHD. Multiple regression (R^2=0.33, P=0.001) show that water sources and altitude explained 33% of the variation on the LHD with water sources (t=3.02) variation being higher than altitude (t=1.4). High rainfall had low LHD in the Park plains due to flooding. In conclusion the main ecological factors that best predict LHD are grass biomass and GSR. Therefore, there is need to conserve ecological factors such as grass biomass and GRS in Ruma National Park.