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Effect of wildlife on forage selection by cattle (Bos indicus Lichtenstein) in a semi-arid environment, Kenya

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Abstract

Rangeland resources play a significant role in household production and sustainability of livelihoods among pastoral communities in Kenya. Although wildlife is one of the rangeland resources, it is viewed by pastoralists as a competitor with livestock for grazing resources rather than an economic resource. It is assumed that competition between wild herbivores and cattle may have an impact on the forage biomass in rangelands as well as on livestock production. It is from this view point of competition between wildlife and livestock for forage resources, that this study assessed effects of forage utilization by wildlife on cattle diet, plant community composition, forage biomass and level of forage utilization in semi-arid lands in Kenya. The following hypotheses were tested: there is a decline in proportion of dominant grasses due to wildlife grazing; there is a decline in forage biomass due to grazing by wildlife and there are changes in the diet of cattle (*Bos indicus* Lichtenstein) due to grazing by wild herbivores. Grazing experiments were conducted at the Kenya Long-term Exclosure Experiment (KLEE) on Mpala Ranch, Laikipia District, Kenya. A number of techniques were used during data collection: line transects and $1m^2$ quadrats to assess plant species composition, richness and diversity. Forage biomass and increment in forage weight in grazed and ungrazed exclosures were determined by use of a disc pasture meter, whereas plant species consumed by cattle and wild herbivores were assessed by observation during feeding. The dietary forage composition of herbivores was done by micro-histological analysis of faecal samples of cattle, zebra, oryx, hartebeest and Grant's gazelle. The results indicate that there was a high (>21 %) proportion of the tall coarse grasses (*Pennisetum stramineum* and *P. mezianum*) in the exclosures grazed by cattle with wildlife in wet and dry seasons, whereas 21 % in the exclosures grazed by wild herbivores. The proportions of *Themeda triandra* in the exclosures grazed by cattle with wildlife

in the dry season was 18 %, whereas it was more than 25 % in the exclosures grazed by cattle with wildlife in the wet season. The results also indicate that there were very highly significant ($p<0.0032$ and $p<0.0015$) differences in percentage composition of dominant and less dominant grasses between the grazed and ungrazed exclosures during the dry seasons, whereas a significant ($p<0.05$) difference and a highly significant ($p<0.01$) difference in percentage composition between the grazed and ungrazed exclosures during the wet seasons. 5 – 6 % of the total herbaceous forage biomass (0.7 % dry matter intake) was consumed in the exclosures grazed by wildlife, whereas 13 – 17 % (2.8 % dry matter intake) was consumed in the exclosures grazed by cattle. There was a large decrease of forage biomass in the pasture grazed by cattle. However, there was no significant ($p<0.133$) difference in forage biomass in exclosures grazed by large wildlife or grazed by elephants (mega-wildlife). There was less than 12 % utilization of dominant grass species in the exclosures grazed by wildlife, whereas over 40 % utilization of dominant grass species in the exclosures grazed by cattle. The results indicate that there is no evidence that grazing by wild herbivores decreases forage biomass in the pasture. Wildlife, therefore, should not be hunted out on communal grazing lands because it has no significant impact on the available forage biomass for livestocks. Nonetheless, stocking rates of livestock should be consistent with forage production so that wildlife conservation is integrated in pastoral production systems.