



Dr. Koech Oscar Kipchirchir is a Kenyan national born on 25th July, 1985. He holds a Ph.D in Drylands Resource Management, MSc degree in Range Management and BSc degree in Range Management all from the University of Nairobi, Kenya. He is currently a Tutorial Fellow at the University of Nairobi, Department of Land Resource Management and Agricultural Technology since 2012. He has also worked as research assistant in various projects addressing climate change and adaptation in rangelands of Kenya. He has also worked as a consultant for various tasks on environmental conservation, rangeland management and food security and pastoral livelihoods in the horn of Africa. His field of specialization is dry land resource management: Livestock feed resources, livestock nutrition, environmental management and conservation. His interests are in the invasive species (*Prosopis juliflora*) in pastoral livestock production and climate change adaptation in the drylands as well as the exploitation of native rangeland grasses as livestock feed resources in the drylands. He has published a number of scientific papers in peer reviewed journals especially on livestock feed resources, irrigated pastures and environment. He can be contacted at: P.O Box 00625-00625, Nairobi, Kenya, cell +254 725 513 044. Email: okkoech@yahoo.com OR oscarkip@uonbi.ac.ke <https://profiles.uonbi.ac.ke/oscarkip/biocv>

Thesis Title

COMPARATIVE EVALUATION OF SIX INDIGENOUS RANGELAND GRASSES FOR PASTURE PRODUCTION UNDER VARYING SOIL MOISTURE CONTENTS IN TANA RIVER COUNTY, SOUTHEASTERN KENYA

Thesis Abstract

Aboveground biomass yields by six indigenous rangeland grasses in pure and mixed stands at 80%, 50% and 30% field capacity (FC) and rainfed soil moisture conditions were determined. The soil moisture was allocated to four main plots. Each main plot was subdivided into 30 subplots which were randomly allocated to ten grass species treatments replicated three times. All the three water treatment levels yielded significantly ($p \leq 0.05$) higher above ground dry matter (AGDM) than the rainfed in pure and mixed stands. *S. sudanense* had the highest yields at 80% FC ($13.7t\ ha^{-1}$), though not significantly

different from the 50 and 30 % FC (11.6t ha⁻¹ and 7.7t ha⁻¹), respectively. *C. gayana* and *C. roxburghiana* yields were not significantly affected by changes in soil moisture content with yields ranging between 10.1 and 10.8t ha⁻¹ but were lower than those of CR (<3.3t ha⁻¹). *C. ciliaris* performed better at 50% FC (9.1 t ha⁻¹). The 5 species mixed plots had greater than 9t ha⁻¹ at 80% FC which is attributed to functional diversity effects under mixture. Differences in tiller numbers across the watering treatments and grass species were not significant, but very low under rainfed conditions. The tiller heights in all the species were lower under rainfed than irrigated treatments. *S. sudanense* had the highest tiller height followed by *C. gayana* and *E. Macrostachyus*, respectively. The three species also had higher AGDM yields than *E. superba*, *C. ciliaris* and *C. roxburghiana*. Irrigation increased the productivity of the six range grass species. *S. sudanense* and *C. gayana* performed better in AGDM production under lower irrigation levels and are therefore suited for production under irrigation in the semi-arid rangelands.

Keywords: Soil moisture content; Range grasses; Pasture irrigation; Semi-arid rangelands; Herbage; Biomass yields