ABSTRACT

Sugarcane productivity in Kenya has declined despite increased acreage and new cultivars possibly due to use of old-cultivar agronomic inputs. The N-K_2O optimal rates for new cultivars are unknown. Kenya Sugar Industry intends to pay farmers based on sucrose instead of tonnage however, factors that influence productivity e.g. N-K_2O rates and harvesting age have not been evaluated. Foliar analysis is a diagnostic tool, but has not been embraced. The objective was to compare variations in soil-foliar nutrients levels and productivity of three ratoon-sugarcane cultivars due to N-K_2O rates and harvesting age. Design was 3x4x2 split-split plot, four replications (CO421-control) and test cultivars (KEN82-472 and KEN83-737) in main plots; 0-50-100-150kg N/ha (sub-plots), 0-100kg K_2O/ha (sub-sub plots-6x10m; 8 rows-1.2m apart). The trial was a continuation of an experiment on sugarcane plant crop at Kibos. Soil-foliar analyses, yields and quality were done using standard methods. Cultivars significantly (p≤0.05) influenced soil K at 0-15cm depth (post-harvest) indicating that ratoon had higher K-extracting ability than plant crops. Only K_2O applications significantly (p≤0.05) varied both pH and soil nutrients implying that it was inadequate. Cultivars recorded higher increments in foliar nutrients of new cultivars than in the old from 3rd - 6th MAR with the peak at 5th MAR, but nutrients levels declined afterwards. This showed that foliar contents are cultivar dependent and foliar sampling conducted later than the 5th MAR would give lower levels. Nitrogen and potash significantly increased foliar contents with 100kg N-K_2O rates. Cultivars significantly (p≤0.05) influenced yields with new cultivars having higher yields than control. Increasing N-K_2O rates significantly increased yield with 100kg N-K_2O/ha recording the highest. Cultivars and N-K_2O rates significantly (p≤0.05) increased pol%, brix% and commercial cane sugar (CCS%) between 10-16th MAR with the peaks at 14th MAR. After the peaks, the quality depreciated more rapidly in new than old cultivars. The regression showed maximum CCS% of 11.88% and above 14.3% for CO421 and test cultivars at 13th and 12th MAR respectively; which illustrated that cultivars benefited from N-K_2O applications. The R^2>0.85 meant that CCS% may be used to predict harvesting time. Frequent soil analysis may not be necessary because treatment effects can manifest after a longer time while foliar sampling can be conducted before the 5th MAR. Proper cultivar selection be done, 100kg N/ha be maintained, K_2O application be re-introduced while new and old cultivars be harvested at 12th and 13th MAR respectively; for realization of higher ratoon-cane productivity.