

ABSTRACT

Sugarcane is the third most important commodity crop in Kenya after tea and coffee. The productivity of the crop has been declining despite existence of recommended agronomic and cultural practices and opening new sugarcane lands. Though high yielding and early maturing varieties have been introduced in Kenya Sugar Industry to overcome low yields, the problem persists. Farmers apply nitrogen either in single dose or split. It is not known if the rates and mode of application are appropriate for the new varieties. The industry pays farmers based on tonnage of delivered millable cane, but is considering changing payment to a combination of yield and quality. It is not known if the payment method shall be influenced by agronomic inputs and timing of harvesting period. The objective of this study was to establish the influence of nitrogen fertilizer applied either in single or split to ratoon crop of new (D8484) and old (CO421) variety on soil and leaf nutrients levels, cane yields, quality and optimal harvesting age. The experimental design was a 2x4x3 split split-plot where varieties were the main treatment, nitrogen rates and application modes formed the sub, and sub-sub treatments, replicated three times. Four rates of urea were evaluated (0, 60, 120 and 180 kgN/ha), applied once (100%) at 3 months after ratooning (MAR), split twice (50-50%) and applied at 3 and 6 MAR and split thrice (40-30-30%) and applied at 3, 6 and 9 MAR, respectively. The trial was a continuation of a research at Kenya Sugar Research Foundation, Opapo, where the plant crop received similar treatments. Analysis of soil and leaf nutrients levels, cane yields and quality parameters was done using recommended methods. The results showed that at start and at harvest of ratoon crop, the soil pH remained within the range suitable for sugarcane growing. There were no significant treatment effects on soil P, Ca, Mn, Zn and Fe levels. Only soil K significantly ($p \leq 0.05$) declined due to variety D8484 at 0-15cm at harvest and at both start of ratooning and harvest at 15-30cm soil depth. Significant ($p \leq 0.05$) leaf %N values were recorded due to varieties from the 5th to 10th MAR. Leaf nitrogen contents in both varieties were similar in the 3rd and 4th MAR, peaked at the 5th MAR and decreased thereafter. Throughout the monitoring period, variety D8484 out-yielded ($p \leq 0.05$) CO421. Pol%, brix% and sugar yields were significantly influenced by varieties and N fertilizer rates. Based on commercial sugar yield, it is concluded that, ratoon crops of varieties CO421 and D8484 can be harvested at 18th and 17th MAR, respectively. Leaf sampling and nutrients analysis should be done before 5 MAR. Nitrogen fertilizer rate of 60 kgN/ha may be adopted in order to realize profitable sugar yield while split application may be done for other reasons like ensuring uniformity in application and spreading cash flow, but not for yields and commercial sugar benefits.