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Effects of Pre Cutting Nitrogen Application Rate and Time on Seed Cane Quality of Sugarcane (*Saccharum officinarum* L.) Crop at Finchaa Sugar Estate

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Abstract

Field experiment was conducted at Finchaa Sugar Estate during the 2010/11 cropping period to assess the effect of rate and time of pre-cutting nitrogen fertilization on seed cane quality of sugar cane (*Saccharum offcinarum* L.) crop. The treatments consisted of four levels of N (0, 23, 46, 69 kg N ha^{-1}) and four times of N application (8,

treating seed cane with N 8WBC for commercial planting resulted in improvement of seed cane stalk height, girth,

reducing sugar and total N content. Pi4a-1.2 TD[r](resutent.)-0.7(f seedt.)C fortheedt.)rate-1.2 T0.7i23 kg-1.2 Tha

$^{-1}$ 8WBC resulted in higher seed cane height. However, pre-cutting N treatment with the rate of 69 kg ha^{-1} 8WBC resulted in higher reducing sugar and total N content. On the other hand, treating the seed cane with N at the rate of 23 kg ha^{-1} 2WBC resulted in WKHSUHFXWWLQJ1DSSOLFDWLRQD with N at the lower rate of 23 kg ha

$^{-1}$ 8WBC had a dual advantage of improving quality (in terms of height, reducing sugar and total N content) of the seed cane crop.

Keywords: Weeks Before Cutting (WBC); Pre-cutting N application; Seed cane; Seed cane quality (Sugar cane)

Introduction

Intensi cation of sugarcane cultural treatments (fertilization, irrigation, weeding, etc.) and agronomic related production factors play an important role for producing high cane and sugar yield per unit area. However, lack of proper cultural practices speci c to fertilizer treatments on seed cane elds are among the major constraints of sugarcane production in Ethiopia in general and at Finchaa Sugar Estate in particular. Usually, elds of light red chromic luvisol have been allocated for the seed cane production and fertilized with Di-ammonium phosphate (DAP) with the rate of 250 kg ha^{-1} at planting and 150 kg urea ha^{-1} at about two and half months a er planting in the same way as the commercial cane. However, the purpose of production and quality required to obtain is too di erent [1].

Seed cane production, which is an integral component of sugar production, o en receives less priority than the commercial crop plants in many sugar cane plantations [2,3]. Most of the research works on seed cane has focused also on the mechanics of cutting and fungicidal treatments of setts. erefore, little e ort has been made to improve cultivation of seed cane [3,4]. On the other hand, it is emphasized that improving seed cane production is the basis for satisfactory crop stand establishment. Hebert [5] pointed out that planting sound pieces with high germination capacity is very essential in order to maintain a uniform stand of sugar cane that ultimately produces high cane and sugar yield. us, it is unquestionable that seed cane plants should receive special cultural treatments such as fertilization, irrigation, crop protection measures, and etc.

Apart from other cultural practices, fertilization is one essential input for seed cane production. In general, the importance of balanced fertilizer application to sugar cane has o en been emphasized [6-8], since sugar cane by its nature requires nutrients such as nitrogen, phosphorous and potassium in large quantities. According to Russell [9] nitrogen occupies the highest position in the nutrition of sugar cane. Nitrogen fertilization enhances the growth of sugar cane and enables the plants to take up other nutrients [10].

Hebert [5] asserted that increasing the level of nitrogen to the optimum requirements of seed cane plants correspondingly increases

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stalk growth parameters (internodes number and weight per stalk) might be attributed to the shorter time gap that occurred between nitrogen application and cutting of the seed cane for planting the subsequent commercial crop. is suggestion may be substantiated by the fact that, sugarcane has low nitrogen use e ciency, particularly so is variety N-14 [22[lwhC by

m0.2n-1(22[lwh4cutting o484 [ptav)dw T;*most

starch and glucose contents were essential for good seed though their content varied with different varieties. There was also a high positive correlation with amide-N but variable with glucose. However, glucose content of setts was considered as a reliable index of planting material for germination. Thus, the causes of increased germination were attributed to the greater availability of food, water or nutrients from the substrate to the growing bud or an internal metabolic change in the sown sett culminating to a favorable influence on the emergence and after growth of the sugarcane buds [25].

Effect of pre-cutting nitrogen application rate and time on seed cane stalk/sett moisture and fibre content

The main effect of time of pre-cutting nitrogen application significantly ($P \leq 0.05$) influenced the moisture content of the seed cane. However, neither the main effect of rate of nitrogen application nor the interaction effect of the rate and time of nitrogen application had significant ($P \leq 0.05$) influence on moisture content of the seed cane. Fibre content of the seed cane was not affected by the main effect of the rate of nitrogen as well as the time of pre-cutting nitrogen application. It was not also affected by the interaction effects of the two factors (Table 7 and Appendix Table 1).

Sett moisture content increased significantly by about 1% when the time of nitrogen application before cutting was lengthened from 2 to 8 weeks before cutting. However, this increase in moisture content was in statistical parity with the moisture content of the seed cane that occurred when the application of nitrogen was done 4 weeks before cutting the cane for commercial planting. Consistent with this result,

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Brix% cane (apparent/total soluble solids in a juice) is the second qualitative parameters used for maturity judgment in sugar cane production [30]. However, the lowest reading result of brix and pol were recorded for N treated plots and the highest was observed for untreated check plots. ese results are in accord with those of Wiedenfeld [32] and who reported that late application of N resulted in poor juice quality (low brix and pol value) in matured cane but in contrary to this, it is a good quality for seed cane plants in maintaining food reserve for the germinating buds [20,33].