Trash Mulch and Weed Management Practice Impact on Some Soil Properties, Weed Dynamics and Sugarcane (Saccharum officinarum *L.*) *Genotypes Plant Crop Productivity*

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RESEARCH ARTICLE

Trash Mulch and Weed Management Practice Impact on Some Soil Properties, Weed Dynamics and Sugarcane (*Saccharum officinarum* L.) Genotypes Plant Crop Productivity

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Abstract The effects of sugarcane trash mulch rate and weed management practices on some soil properties, weed dynamics and productivity of sugarcane genotypes plant crops were investigated at Badeggi, Nigeria in 2016 and 2017. The results revealed that application of 6 t ha^{-1} mulch produced comparable soil organic carbon content but lower weed dry matter to 9 t ha^{-1} which significantly added more total nitrogen, available phosphorus and soluble potassium to the soil. Application of PE diuron plus POE 3—maize force, resulted in a comparable weed dry matter to PE diuron plus POE 3—maize force plus 2 MHW. Similarly, PE diuron plus POE 3—maize force, 5 MHW and PE diuron plus POE 3—maize force plus 2 MHW produced comparable stalks and Brix content. Also, 5 MHW generated taller sugarcane plants. Application of PE diuron plus POE 3—maize force proved equally effective as 5 MHW in contributing the highest cane yield. Highest soil total nitrogen and available phosphorus were found in NCS 001. Lower weed dry matter was found in Bida local, and taller stalks, maximum cane girth, higher Brix content and cane yield were observed in NCS 001. In conclusion, application of 9 t ha^{-1} trash mulch with 5 MHW or PE diuron plus POE 3—maize force plus 2 MHW or PE diuron plus POE 3—maize force effectively controlled weeds, increased stalk height, cane girth, Brix content and cane yield of sugarcane, especially NCS 001.

Keywords Genotype · Plant crop · Sugarcane · Trash mulch · Weed management · Weed species

Introduction

Sugarcane (*Saccharum officinarum* L.) is a leading cash crop that accounts for over 60% of the sugar required in the world and the remnant 40% being contributed by sugar beet (Sulaiman et al. 2015). It is widely grown in several tropical and subtropical countries of the world. The major sugar-producing countries of the world are Brazil, India, China and Thailand which contributes 60% of the total production (De Aquinoa et al. 2017). In tropical Africa, Mauritius, Kenya, Sudan, Zimbabwe, Madagascar, Ethiopia, Malawi, Zambia, Tanzania, Nigeria, Cameroun and DR Congo are the leading sugarcane producers (Sulaiman et al. 2015).

In Nigeria, it is grown on an estimated land area of over 500, 000 hectares with a yield potential of over three million metric tons of sugarcane (Sulaiman et al. 2015). The gap between the average and potential yield of sugarcane in Nigeria is mostly due to a number of factors. This includes poor crop management and cultural practices like the use of low yielding varieties for the different agro-ecologies, water scarcity and lack of irrigation system in drought-prone environment, improper agronomic practices (inappropriate use of plant density, inappropriate fertilizer use and poor disease control method and timeliness, unplanned harvesting schedules), lack of access to credits and rises in production cost, unpredictable weather patterns, and inadequate research and extension support

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