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Productivity, Water use efficiency, Soil properties of Sugarcane as influenced by trash mulching and weed management practices under dry season conditions in Nigeria

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Abstract

Productivity, Water use efficiency and Soil properties of Sugarcane were evaluated under dry season conditions. The treatments consisted of two sugarcane genotypes [Bida local and NCS 001], four cane trash mulch rates (0, 3, 6, 9 t ha^{-1}) and four weed management practices [weedy check, five monthly hoe weeding (5 MHW), pre-emergence (PE) application of diuron at 2 kg a.i ha^{-1} + post-emergence (POE) application of 3 – maize force at 179.2 g ha^{-1} (metolachlor 375 g L^{-1} + terbuthylazine 125 g L^{-1} + mesotrione 37.5 g L^{-1}+ 2 MHW, and PE diuron + POE 3-maize force] arranged as a split plot in a Randomized Complete Block Design and replicated three times. Weed management practices and trash mulching were allocated to the main plot, while sugarcane genotypes were the subplot. Reduction in water loss through evapotranspiration and retention of moisture content (41.9 %) was significant with application of 9 t ha^{-1} trash mulch. This invariably sustained the growth of sugarcane and reduced total crop failure during the dry seasons. The cane yield, considered as the most important character of sugarcane, was positively and significantly correlated with sprouting percentage (r=0.531**), number of tillers (r=0.574**), number of millable canes (r=0.716**), sugarcane stalk girth (r=0.595**) and height (r=0.677**), sugarcane brix (r=0.595**), organic carbon (r=0.568**), nitrogen (r=0.532**) and soil moisture content (r=0.531**) while Phosphorus (r=0.445), Potassium (r=0.397), showed positive but non-significant correlation with cane yield. Cane yield was negatively correlated with evapotranspiration (r= -0.500) and weed dry matter (r= -0.556) at all the stages. In order to manage weeds for sustainable growth and increased yield of sugarcane variety, NCS 001 should be used with PE diuron at 2.0 kg a.i ha^{-1} + POE 3-maize force at 2.0 kg a.i ha^{-1} in combination with 6- 9 t ha^{-1} of trash mulch.

Keywords: *Cane trash, Genotypes, Soil properties, Sugarcane, Weed management*