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Effects of Irrigation Scheduling and Soil Management on Maize (Zea mays L.) Yield in Guinea Savannah Zone of Nigeria

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Abstract : The main objective of any irrigation program is the development of an efficient water management system to sustain crop growth and development and avoid physiological water stress in the growing plants. Field experiment to evaluate the effects of some soil moisture conservation practices on yield and water use efficiency (WUE) of maize was carried out in three locations (i.e. Mubi and Yola in the northern Guinea Savannah and Ganye in the southern Guinea Savannah of Adamawa State, Nigeria) during the dry seasons of 2013 and 2014. The experiment consisted of three different irrigation levels (7, 10 and 12 day irrigation intervals), two levels of mulch (mulch and un-mulched) and two tillage practices (no tillage and minimum tillage) arranged in a randomized complete block design with split-split plot arrangement and replicated three times. The Blaney-Criddle method was used for measuring crop evapotranspiration. The results indicated that seven-day irrigation intervals and mulched treatment were found to have significant effect (P>0.05) on grain yield and water use efficiency in all the locations. The main effect of tillage was non-significant (P<0.05) on grain yield and WUE. The interaction effects of irrigation and mulch were significant (P>0.05) on grain yield and WUE at Mubi and Yola. Generally, higher grain yield and WUE were recorded on mulched and seven-day irrigation intervals, whereas lower values were recorded on un-mulched with 12-day irrigation intervals. Tillage exerts little influence on the yield and WUE. Results from Ganye were found to be generally higher than those recorded in Mubi and Yola; it also showed that an irrigation interval of 10 days with mulching could be adopted for the Ganye area, while seven days interval is more appropriate for Mubi and Yola.

Keywords : irrigation, maize, mulching, tillage, savanna
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