ABSTRACT

Adverse soil moisture deficit as a result of high ambient temperatures and high velocity June winds at critical stages of maize growth had been singled out as the most important factor limiting maize yield in Coastal Kenya during long rain season. This study was carried out to study the effect of foliar applied kaolin and coir dust mulch on evapotranspiration and yield of Pwani hybrid 4 maize. A 2x2x4x3 split-split plot design experiment, replicated thrice was set at Pwani University Farm, in 2007 and 2008 seasons, with coir dust mulch as the main plot treatments; irrigation as the sub-plot treatments, and kaolin at sub-subplot levels. Parameters measured included plant height, periodic above ground biomass and grain yield, soil moisture content, soil and air temperatures, % relative humidity and wind run at 31, 49, 66, 83 and 100 days after sowing. Energy and water balance equations were used to determine crop evapotranspiration. Genstat 14th Edition was used in data analysis and the means obtained used to develop ET-Yield production functions for predicting Pwani hybrid 4 maize yield in Coastal Kenya. Coir mulching resulted in reduced evapotranspiration early in the seasons, contributed to highest (9-15 %) soil moisture conservation, availing it at later stages of growth, up to 49th DAS. Beyond this period irrigation provided superior soil moisture conditions, especially at critical stages of maize growth. Coir mulching early in the season could substitute supplementary irrigation without significant losses in grain yield. Coir mulching was more beneficial in biomass and grain production during the relatively drier season II than during wetter season I. Coir mulch alone treatment resulted in highest grain yield ($p < 0.05$) in both seasons, of 6.7 and 4.9 tons ha-1. Interactions of coir mulch and irrigation offered the best option in ameliorating June winds effects. Although irrigation resulted in highest biomass, it did not result in highest grain yield. Application of kaolin alone depressed final biomass and grain yield. However, its interactions with coir mulch and irrigation resulted in increased yield during a wetter season except when applied at floral stages, while its application during a relatively drier season resulted in depressed yield. Its application during wetter conditions in coir mulched or irrigated maize crop resulted in significant ($p < 0.05$) increases in biomass and grain yield of 20-31 % and 41.9 % respectively. Kaolin had ―short and long term‖ effect on levels of soil moisture, seasonal evapotranspiration and biomass. The response of Pwani hybrid 4 maize yield to kaolin was highest at floral stages, and under stress conditions. Multiple linear regressions indicated that coir mulching was the most important factor in determining the level of grain yield.

Keywords

Pwani hybrid