AS> Vol.2 No.2, May 2011

OPEN ACCESS

Water use efficiencies of maize cultivars grown under rain-fed conditions

PDF (Size:240KB) PP. 125-130 DOI: 10.4236/as.2011.22018

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ABSTRACT

Enhancing water use efficiencies of rain-fed maize is a requirement for sustainable maize production, particularly in areas prone to low/drought and erratic rainfall patterns. This study was conducted to assess the relationship between total biomass/grain yield and water use efficiencies of three maize cultivars (Golden Crystal, Mamaba and Obatanpa) grown under rain-fed conditions in a coastal savannah agro-ecological environment of Ghana. Results of the study showed that a unified linear model, WUETDM = 0.03TDM with R2 = 0.765 and P ⩽ 0.001, described adequately the relation between wa-ter use efficiency and total biomass (dry matter), which is applicable for the three maize cultivars for both the major and minor cropping seasons. A linear model could only, however, describe adequately well the relation between WUEGY and GY for the major (WUEGY = 0.001GY – 0.67; R2 = 0.996; P ⩽ 0.001) and minor (WUEGY = 0.002GY + 0.289; R2 = 0.992; P ⩽ 0.001) cropping seasons for all the maize cultivars. The linear models developed for the maize cultivars, re-lating WUEGY to GY, are specific to each of the crop growing seasons, indicating that seasonal rainfall impacts significantly on harvest index of the maize cultivars but differently in each of the crop growing seasons as a results of dif-ferences in seasonal rainfall. However, the models could be used to estimate water use efficiencies of each of the three maize cultivars given the appropriate TDM and GY as inputs for the environment under which the study was conducted.

KEYWORDS

Water Use Efficiency; Maize Cultivars; Rain-Fed

Cite this paper

Asare, D. , Frimpong, J. , Ayeh, E. and Amoatey, H. (2011) Water use efficiencies of maize cultivars grown under rain-fed conditions. *Agricultural Sciences*, 2, 125-130. doi: 10.4236/as.2011.22018.

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