EFFECT OF MOISTURE DEPLETION RATES AND IRRIGATED ZONE DEPTH ON CONSUMPTIVE AND WATER USE EFFICIENCY OF WATER YIELD, *Moench. Sorghum bicolor (L.)*

Bassim Hussein Farhan **Abdul -Amir Th . Salih***

***Soil and Water Resources - College of Agriculture - University of Baghdad.**
abc8976@yahoo.com

ABSTRACT

Implemented field experiment to grow the crop sorghum (*Sorghum bicolor* L. Moench) class Ingath of the autumn season 2012 in the fields of the General Company for Horticulture and Forestry- Zaafaraniya / Ministry of Agriculture , south of Baghdad. In the soil of silty clay according to design were arranged in a split-plot design with three replications, which included major treatment proportions of moisture depletion as added irrigation water after depleting 50%, 70%, 90% of available water to plant, and included secondary plots the depth of the irrigated zone is D1 (0-30 cm) from the beginning of planting to the harvest and the second depth D2 (0-10 cm) from agriculture to the beginning of the vegetative growth stage, then increase depth of irrigated zone (0-20 cm) to the beginning of flowering, and (0-30 cm) to the end of physiological maturity. This experiment is designed to study the effect of the proportions of moisture depletion and the depth of irrigated zone on the plant growth of sorghum and estimate the water consumption of the crop under conditions of Iraq center . Calculated the amount of water added for each irrigate for compensate depletion moisture during the growing season, depending on measurements of the water content weighted method . Estimate the actual water consumption by measuring the water content of the soil after irrigation and before next irrigate on the length of the growing season. Calculate reference evapotranspiration By the Penman-Monteith modified equation . Calculate the crop coefficient (Kc) , the yield response factor (Ky) and field water use efficiency (WUEf) and crop water use efficiency (WUEc) . Has been studying factor of yield of the main results can be summarized that have been obtained, including the following: The highest grains yield (6428) $kg.h^{-1}$ from at treatment of T1D1, and reached less yield grains (3622) $kg.h^{-1}$ at treatment of T3D2. The treatment T1D1gave highest bio-yield reached 25.187 $ton.h^{-1}$and the T3D2 treatment gave the less bio-yield 11.578 $ton.h^{-1}$. Moisture depletion treatments , depth of the irrigated zone and the interaction between them didn't have a significant impact on (WUEc , WUEf) , treatment T2D2gave the highest value of WUEc , WUEf reached to (1.06, 1.09) kg of $grain.m^{-3}$ respectively, while the treatment T3D2given lower value to WUEc , WUEf reached to (0.88, 0.92) kg of $grain.m^{-3}$, respectively . treatment T3 gave the highest value of yield response factor Ky reached (1.05 to 1.21) for D1 and D2, respectively. This means that these two treatments were more sensitive to the deficit of irrigation from the rest

of the other treatments that Ky values have ranged between (0.63 to 0.87).

Key words : depletion moisture , Irrigated Zone Depth, water consumption Coefficient ,sorghum . , Water use efficiency , Yield Response,

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