EFFECTS OF WATER STRESS AND PLANT DENSITY ON YIELD AND WATER USE EFFICIENCY OF SAFFLOWER (*Carthamus tinctorius* L.) AT GROWTH STAGES OF PLANT

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ABSTRACT

In order to evaluate of water stress at different growth stages and spacing between rows on yield, yield components and Water Use Efficiency of safflower (*Cv*. Mees), an experiment was conducted in experimental field crop department-college of agriculture -University of Baghdad during the two successive winter seasons of 2008- 2009, 2009-2010. The experiment was conducted as factorial with randomized complete blocks design with three replicates. The first factor were assigned to the four irrigation levels (irrigation, none irrigation at branching, flowering buds and flowering stages) and The second factor were allocated to the different plant spacing on row (75 and 100 cm). The results showed that irrigation treatment affected on branches per plant, heads per plant, 300- seeds weight, dry matter weight, seed weight per plant, total seed yield, harvest index and water use efficiency. The non-irrigation at flowering stages had the highest branches per plant (24.15 and 24.53 branch/plant). Non-irrigation at flower buds stage gave highest number heads per plant (46.73 and 45.03 head/plant), dry matter weight per plant (103.70 and 105.05gm/plant), seed weight per plant (52.02 and 50.57 gm/plant), total seed yield (2366.99 and 2279.73 kg/ha.) and water use efficiency (0.61 and 0.58 kg/m^3) then our traits .The highest 300- seeds weight was 14.67 and 14.50 gm in none irrigation at branching in the two seasons respectively. Plant spacing affected heads per plant, seed per head, 300- seeds weight, dry matter weight per plant, seed weight per plant, total seed yield and harvest index .100cm plant had the highest heads per plant (40.93 and 41.10 head/plant), seed per head (30.24 and 30.71 seed/head), 300- seeds weight, (13.05 and ١٢.٩٠ gm), dry matter weight per plant (93.67 and 100.18 gm/plant), seed weight per plant (47.23 and 51.14 gm/plant) total seed yield (1889.30 and 2045.60 kg/ha.) and harvest index (50.36 and 51.04%) respectively. Interaction between irrigation regime and plant spacing was significant effect heads per plant, dry matter weight per plant, seed weight per plant, total seed yield and harvest index. Highest seeds yield/ha. was obtained from non-irrigation at flower buds stage

planting at 100cm. highly positive correlations were found between plant seed weight and head per plant and seed per head in both seasons.

Key Words: Water Stress; Safflower; Plant Density; Water Use Efficiency.