

## ASSESSMENT OF WATER CONSUMPTIVE USE AND CROP FACTOR FOR CABBAGE *Brassica oleracea. L* UNDER DIFFERENT IRRIGATION SYSTEMS.

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### ABSTRACT

Field experiment was conducted to assess the actual water consumptive use  $ET_a$ , references water consumptive use  $ET_0$  and crop factor  $K_c$  for cabbage under micro-sprinkler irrigation (MSI), drip irrigation (DI), sub surface drip irrigation (SDI), and furrow irrigation (FI). The experiment was conducted at a farm northern of Baghdad (latitude 33 north and longitude 45 east) at autumn season 2009. The experiment was designed according to RCBD in four replications. Time of irrigation and amount of water applied were in accordance with soil moisture content and water applied up to field capacity limit. Water balance equation was used to determine  $ET_a$  for plant growth stages (vegetative growth, leaves wrap, maturity and harvest). Penman-Monteith equation was used for  $ET_0$  estimation. Cabbage crop factor was calculated From  $ET_a$  and  $ET_0$  for each growth stage and for each method of irrigation. The results indicated that  $ET_a$  varied with irrigation systems.  $ET_a$  were 406, 381, 365 and 393 mm.season<sup>-1</sup> for MSI, DI, SDI and FI, respectively. Maximum  $ET_a$  values were at vegetative growth and maturity stages the relative values about 19% to 38% of total  $ET_a$  for all treatments.  $ET_a$  decreased about 3% to 10% for DI and SDI compared to MSI and FI.  $ET_a$  increased by 3% in MSI comparing with FI.  $ET_0$  value was 434 mm.season<sup>-1</sup> during cabbage growth season.  $K_c$  values varied with irrigation systems with 0.94, 0.88, 0.84 and 0.91 for MSI, DI, SDI and FI respectively. The maximum value of  $K_c$  occurred at maturity stage with 0.965, 0.910, 1.141, and 1.140 for irrigation treatment respectively. It is clear that micro-irrigation systems reduced cabbage  $ET_a$  at stages growth so it reflected on  $K_c$  values.

**Key words:** Water balance equation, micro-sprinkler irrigation, Surface and sub surface drip irrigation, furrow irrigation, water consumptive use, crop factor, cabbage.

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