MANAGEMENT OF FERTIGATON UNDER ARID CONDITION

By

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ABSTRACT

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Excessive use of chemical fertilizers leads to soil destruction, water and environmental pollution, reduced productivity, low product quality, water distribution and fertilizer efficiency. Good irrigation and fertilization systems management methods is very important to prevent soil and plant conservation and achieving highest efficiency of water and fertilizer use ,to produce high quality and quantity crops for increasing local production and export. Onion and cowpea are important crops in Egyptian cultivators. Onion is strategy crops for export, and cowpea is called a poor men's meat. The current study was conducted through two open field experiments on onion and cowpea crops and seasons, to manage suitable fertigation programs through fertilizer type, form, and time vs. emitters type and discharges and to investigate their impacts on some plant attributes, yield and irrigation water productivity.

The first Experiment was carried out from open field in private farm for vegetables and fruits production, located in Hosen sector at Alexandria Cairo desert road km 70 from Cairo, El-Behiara governorate for Onion seeds, design for the first experiment was a split plot design with four replicates and two factors. Main factor : effect of fertilizer application method "F_m" : Cattle manure (F_1), mixing of cattle manure and chemical fertilizer "fertigation" with rate of 30 :70 (F_2) and chemical fertilizer "fertigation" (F_3). Second factor: emitters type: OT_4 "I_1", emitters built in drip line (GR 16) "I_2" and emitters, anti roots "I_3" and each sub-plot is was 3.5 m long and 3 m., wide (10.5m^2 ie. 1/400 fed.) and include 6 rows 50 cm wide, each 3.5 m long and the distance between sub-plots is left as 1 m to create a buffer zone

Meanwhile, the second experiment was carried out from open field in Agricultural Engineering Research Instute, Ministry of

Agriculture (AEnRI), Giza governorate, For cowpea dry seeds, the experiment included eight treatments were Emitter discharge "q" {12 $L.h^{-1}$ (E_1), 8 $L.h^{-1}$ (E_2)}, Fertigation form "F_F" { Liquid (L_F), Powder (P_F)} and Fertigation time "F_t" { Before irrigation (B_I), After irrigation (A_I)}. At the first experiment results elucidated that applying mixing of cattle manure and fertigation through anti roots emitter (F_2I_3) treatment, obtained highest values of bulb diameter "d_1" (13.88cm), bulb diameter "d_2" (25.10cm), bulb mass "B_m" (195.9g), bulb actual volume "B_V" ($118cm^3$), moisture content "M_C" (99.52 %), bulb yield "B_Y" (15.01Mg. fed^{-1}), and irrigation water productivity "IWP" (6.72 $kg.m^{-3}$), respectively. Meanwhile, by applying cattle manure only through OT_4 emitter (F_1I_1) obtained the lowest values of d_1 (6.24cm),d_2 (5.08cm), B_m (95.6g), B_v ($79cm^3$), Mc (70.13 %), B_y (7.80Mg. fed^{-1}), and IWP (3.49 $kg.m^{-3}$), respectively.

At the second experiment results elucidated that applying powder fertilizer (after irrigation) (P_F A_I) through emitter with 12 Lh^{-1} discharge (E_1) treatment, obtained the lowest values of number of pods / plant "P_n" (5.6 Pods. $plant^{-1}$), number of seeds / pod "S_n" (6.4 seeds. pod^{-1}), seed mass /pod "S_m" (0.97 g), number of seed index "S_I" (15.1 g), seed yield "Ys" (0.79 Mg. fed^{-1}) , irrigation water productivity "IWP" ($3.27kg.m^{-3}$). On the other hand, by applying liquid fertilizer (before irrigation) (L_F B_I) treatment through emitter with 8 Lh^{-1} discharge (E_2), obtained the highest values of P_n (5.3 Pods. $plant^{-1}$), S_n (6.9 seeds. pod^{-1}), S_m (0.97 g), S_I (14.1 g), Y_s (0.75 Mg. fed^{-1}), and "IWP" ($4.66kg.m^{-3}$).

Keywords: fertigaion - drip irrigation - cowpea - onion -irrigation water productivity - yield.

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