*Asian J. of Bio Sci. (2006) Vol. **1** No. 2 : 144-145*

Effect of scheduling of Irrigation on yield of onion (*Allium cepa* L.) irrigated through micro sprinkler irrigation system

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(Accepted : June, 2006)

The field experiment was conducted to study the effect of different cumulative pan evaporation (CPE) levels i.e. 20mm, 30mm, 40mm, 50mm and 60mm CPE on yield of onion irrigated through micro sprinkler irrigation system. The results indicated that the treatments scheduled at lower CPE(20mm) was the best treatment as it produced highest yield of onion after drying (442.05q/ha) and water use efficiency (955.16kg/ha-cm) which was statistically superior over all other treatments. The consumptive use of water was observed highest (462.80mm) in 20mmCPE and lowest (432.59mm) in 60mmCPE.

Key words: CPE levels, Micro sprinkler irrigation system, Onion, Yield, Water use efficiency.

INTRODUCTION

THE micro sprinkler systems have been recently introduced. In these systems, major problems of both sprinkler and drip systems are minimised. Compared to conventional sprinkler systems, the micro sprinkler irrigation systems require less energy, less pressure and low discharge. There is no runoff problem on the soil surface as well as deep percolation problems. Visual inspection of the micro sprinklers is simple and fast. Less time is required for the inspection as compared to several emitters per tree in a drip irrigation system. Hansen and peltersen (1974) recorded highest yield of onion under micro sprinkler irrigation system as compare to drip, furrow and subsurface methods of irrigations. Shinde and Firake (1996) reported that the use of micro sprinkler irrigation for many crops has indicated an increase in yield and water use efficiency. While Srivastava et al.(1999) recorded highest yield of cabbage in the micro sprinkler irrigation (40.23t/ha) followed by drip irrigation(38.97t/ha), surface irrigation (33.54t/ha). Gite (1999) observed better performance in respect of growth, yield and quality parameters in rabi onion under broad bed furrow irrigated through micro sprinkler irrigation systems. Though many research workers observed the more crop yield in micro sprinkler irrigation system, but the information on the effect of scheduling of irrigation i.e. cumulative pan evaporation on yield of onion through micro sprinkler irrigation system are not still available. Therefore, the present investigation is aimed to find out the effect of scheduling of irrigation on yield of onion (*Allium cepa* L.) irrigated through micro sprinkler irrigation system.

MATERIALS AND METHODS

The field experiment was conducted during summer 2001 at Mahatma Phule Krishi Vidyapeeth, Rahuri (India). The experiment was laid in randomized block design with five treatments and four replications . The treatments were based on the irrigation scheduling at different CPE levels *viz.,* 20mm CPE (T_1), 30mm CPE(T_2), 40mm CPE(T_3), 50mm CPE(T_4) and 60mm CPE(T_5). The field size was 25.5 X 32.25 m and divided into twenty equal plots of 5.25 X 5.25 m for four replication, each constituting of five treatments. The buffer strip of width 1.5m was left in between two treatment plots and two replication. The experimental soil was clayey in nature and field capacity, permanent wilting point and bulk density were 37.15, 19.77 per cent and 1.26 gm/cc, respectively. The LDPE lateral of 16mm diameter was used. These laterals were connected to 25mm G.I. submain which was subsequently connected to 50mm of G.I. The MSG(green) micro sprinkler with stakes were operated at 1.0 kg/cm^2 pressure. The average discharge of micro sprinklers was 58lph. The average uniformity coefficient was 92 per cent. The value of uniformity coefficient was consistent with those observed by Gutal et al.,(1989)and Firake et. al.,(1993) .

The onion variety N-2-4-1 was transplanting with spacing 12.5 X 7.5 cm in third week of January, 2001. All treatments were commonly irrigated (85.25mm) after transplanting. The irrigation scheduling was done on the basis of CPE levels. The time of irrigation for each treatment was worked out by using the following equation (1),

$$Ti = \frac{F \times CPE \times 60}{Uc \times Pi} \quad \text{——————} (1)$$

Where,
Ti = time of irrigation (min),
F = integrated factor, taken as 0.75 (Pawar, 1995),
CPE = cumulative pan evaporation (mm),
Uc = Uniformity coefficient (per cent),
Pi = Average rate of precipitation (mm/h),

The times of irrigation for different treatments were calculated as per CPE levels. The yields were statistically analyzed by Analysis of variance methods by simple RBD (Panse and Sukhatme, 1967).

RESULTS AND DISCUSSIONS

Consumptive use of water:

According to the data presented in Table 1, it can be seen that the consumptive use of water and number of irrigations was highest in treatment T_1 (20mmCPE) i.e. 462.8 mm and 22, respectively. Whereas the treatment scheduled at 60 mm CPE was recorded lowest consumptive use of water and number of irrigations.

Yield of Onion:

According to the data presented in Table 2, it can be seen that the yield of onion bulbs (442.05q/ha) after drying and yield of stalks (52.25q/ha) were maximum in treatment T_1(20mm CPE) and significantly superior over all other treatments. Whereas the treatment T_5(60mm CPE) recorded the lowest yield of onion bulbs (145.44q/ha) after drying and yield of stalks (27.125q/ha). Similarly the data presented in Table 2 pertaining to the bulb to stalk ratio revealed that treatment T_1(20mm CPE) recorded the maximum bulb to stalk ratio(8.45) and significantly superior over all other treatments and treatment T_5 recorded the lowest bulb to stalk ratio (5.360). Similar results were recorded by Gite, 1999.

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