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Research Note

# Effect of irrigation systems and planting methods on the yield of sweet potato

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**Key words :**
Irrigation system, Sweet potato,

## INTRODUCTION

Sweet Potato (*Ipomoea batatas* L.) is an important tuber crop, which is used as a staple food, animal feed and for industrial starch extraction as it contains about 20 per cent of starch. India ranks sixth in area but the productivity is very low (80.2 t $ha^{-1}$) which is lower than world productivity level (Verma and Roychaudhury, 2002).

The increasing gap between irrigation potential and its utilization indicates the inefficient use of water. As water is a scarce commodity, particularly in scarcity regime of Maharashtra state, it is necessary to determine the optimum level and time of water use coupled with a suitable method of water application for increasing irrigation efficiency and crop productivity. The pressurized irrigation methods either drip or sprinkler system shows the effect on saving of water and is a solution on problem of water scarcity. A systematic attempt has not been made so far to relate yield with climatological data and different schedules of irrigation water on the basis of IW/ CPE n ratio in sweet potato. Looking on this background, the said study was conducted with the prime aim to determine the effect of irrigation schedules under different pressurized irrigation systems and planting methods on sweet potato.

The experiment was carried out at AICRP on Water Management, MPKV, Rahuri during *Rabi season* 2005. The soil of experimental field was clay loam, low in available nitrogen, medium in available phosphorus and high in available potassium. The soil reaction was slightly alkaline. The experiment was laid out in split plot design with four replications and 30 treatment combinations comprising of 2 planting method *viz.*, ridges and furrows, and broad bed furrows, 3 irrigation system *viz.,* drip, sprinkler and surface with 5 irrigation regimes *viz.,* schedule irrigation at 25 mm CPE for sprinkler system with 1.5, 2, 2.5, 3, and 3.5 cm depth, at 50 mm CPE for surface with 3,4,5,6 and 7 cm depth; and 0.5,0.6,0.7,0.8 and 0.9 composit factor for drip. The plot size was 5 x5 m2 for sprinkler and 2.7 x 5 m2 for surface method.

The recommended dose of 120 kg N, 60 kg $P_2O_5$ and 120 $K_2O$ per hectare was applied. The N and $K_2O$ were applied in the equal splits as a basal dose at planting and top dressed a month after planting. Whole quantity of $P_2O_5$ was applied at the time of planting.

**Planting method:**

Mean number of tubers per plant, their average volume and weight were not significantly influenced either due to broad bed furrow or ridges and furrows, whereas length and girth of tubers were significantly more when raised on broad bed furrows. This might be due to better soil environment for development of tubers. The effect of

**Table 1: Effect of different treatments on weight and yield of tuber in sweet potato**

| Treatments | Weight of tubers plant (g) | Tuber yield (t ha$^{-1}$) |
|---|---|---|
| **Main plot treatmentsp planting layouts :** | | |
| Ridges and furrows | 345.24 | 15.34 |
| Broad bed furrows | 347.02 | 15.65 |
| S.E. ± | 1.22 | 0.10 |
| C.D. (P=0.05) | NS | NS |
| **Irrigation systems :** | | |
| Sprinkler | 350.37 | 16.49 |
| Drip | 358.69 | 18.33 |
| Surface | 329.37 | 11.66 |
| S.E. ± | 1.50 | 0.38 |
| C.D. (P=0.05) | 4.52 | 1.15 |
| **Sub plot treatments irrigation regimes :** | | |
| $I_1$ | 300.65 | 13.34 |
| $I_2$ | 288.35 | 14.05 |
| $I_3$ | 353.20 | 15.35 |
| $I_4$ | 396.29 | 17.51 |
| $I_5$ | 392.25 | 17.22 |
| S.E. ± | 2.12 | 0.54 |
| C.D. (P=0.05) | 6.39 | 1.62 |

$I_1$ : Depth of 1.5 cm at 25 mm CPE by sprinkler, depth of 3.0 cm at 50 mm CPE by surface and 0.5 composite factor for drip
$I_2$ : Depth of 2.5 cm at 25 mm CPE by sprinkler, depth of 4.0 cm at 50 mm CPE by surface and 0.6 composite factor for drip
$I_3$ : Depth of 2.5 cm at 25 mm CPE by sprinkler, depth of 5.0 cm at 50 mm CPE by surface and 0.7 composite factor for drip
$I_4$: Depth of 3.0 cm at 25 mm CPE by sprinkler, depth of 6.0 cm at 50 mm CPE by surface and 0.8 composite factor for drip
$I_5$ : Depth of 3.5 cm at 25 mm CPE by sprinkler, depth of 7.0 cm at 50 mm CPE by surface and 0.9 composite factor for drip

planting method on tuber yield of sweet potato was non significant indicating that there was no significant increase in tuber yield due to broad bed furrows over ridges and furrows (Tabld 1).

**Irrigation systems:**

The mean number of tubers was not significantly influenced due to any of irrigation methods but drip irrigated sweet potato crop recorded significantly more length, girth, volume and weight of tubers than surface and sprinkler method of irrigation (Table 1). Ahire (1999) also recorded increase in number of tubers and weight of tubers of potato in drip method of irrigation. Significantly highest tuber yield (18.33 t ha$^{-1}$) was obtained with drip method of irrigation. This was possible because of uniform distribution of soil moisture in the root zone along with the sufficient supply of nutrients. It must be due to adequate soil moisture status through out the crop growth period. (Saggu and Kaushal, 1993).

**Irrigation regimes:**

Irrigation scheduling with 3.0 cm depth at 25 mm CPE by sprinkler, depth of 6.0 cm at 50 mm CPE by surface and 0.8 composite factor for drip ($I_4$) recorded significantly more number of tubers, their length, girth, volume and weight than other regimes (Table 1). The tuber yield of sweet potato was also significantly increased due to their regime ($I_4$) as compared to rest of the regimes indicating that irrigation scheduling as per this regime is the most viable option to utilize the optimum quantity of irrigation water and to harvest maximum yield of tubers.

The growth and yield was significantly superior under drip method followed by sprinkler method. There was an increase in yield of tuber by 57.20 per cent in drip over that of surface method.

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## LITERATURE CITED

Ahire, N.R. (1999). Effect of row spacing and planting system on growth and yield of potato,cv. KUFRI JYOTI under surface and drip irrigation. M.Sc. (Ag.) Thesis, Mahatma Phule Krishi Vidyapeeth, Rahuri, Ahmednagar, M.S. (India).

Saggu, S.S. and Kaushal, M.P. (1993). Drip irrigation is better than furrow irrigation for potato crop. *Indian Frng.*, **43**(9) : 11-12.

Verma, S.P. and Roychawdhury, S. (2002). Sweet Potato. In : *Handbook of horticulture*. ICAR, New Delhi Publ. pp. 512-516.

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