

## Effect of placement of fertilizers and poultry manure under drip irrigation on growth and yield attributes of brinjal (*Solanum melongena* L.)

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### ABSTRACT

A field experiment was conducted to study the effect of placement of fertilizers and organic manure under drip irrigation on growth and yield attributes of brinjal (*Solanum melongena* L.). Results of the investigation showed that growth and yield attributing characters viz., number of branches, number of leaves, days required for 50 per cent and 100 per cent flowering, fruit length (cm), number of fruits per hill were not significantly influenced due to placement of fertilizers. Yield and yield attributing character such as weight of fruits per hill and weight per fruit recorded significantly higher under treatment RDCF application below dripper over rest of the treatments except RD through mixed fertilizer and urea below dripper and RD through NPK briquettes below dripper. While the growth and yield attributing characters influenced significantly with the poultry manure placement below hill than rest of the treatments except poultry manure placement below dripper.

**Key words :** Brinjal, RDCF, RD, Placement, Dripper, Fertilizers, Poultry manure

### INTRODUCTION

Drip irrigation system is one of the advanced method of irrigation. The system is popular in arid and semi-arid regions with high evaporation, scarcity of water and salt problems. Looking to the advantages of the system, the cultivators are using this system for high value crops like vegetables and orchards.

Manures and fertilizers are critical factors which limits the plant growth and yield of crops, specially vegetable crop like brinjal. The average yield of brinjal in Maharashtra is low because of manures and fertilizers are not being applied at proper stage with proper method of placement. Lack of knowledge of manures and fertilizer management practices, results in low production. Application of organic manures to the soil, improve the physical and chemical properties of soil and which enhance the plant growth and yield. Suitable method of application of manures needs to be develop for judicious and economic use of costly manures. It supplies macro and micro nutrient to the plant throughout the growth period by slow releasing the nutrients.

Placement of manure and fertilizers is of prime importance in drip irrigation where limited quantity of water is applied at spot unlike surface irrigation methods. In surface irrigation fertilizers applied at spot can be distributed in root zone after dissolving it in irrigation water. Therefore, necessary to apply the fertilizer and manures where water is applied in drip irrigation *i.e.* below dripper.

### MATERIALS AND METHODS

The present investigation was under taken at the

Department of Agronomy Farm, College of Agriculture, Dapoli during the *Rabi*-hot weather season, 2005-2006 in split plot design with five main plot treatments as placement of fertilizers and four sub plot treatments as poultry manure placement. The soil of the experiment field was clay loam in texture and medium acidic in reaction. It was medium in available nitrogen and low in available phosphorus and moderately high in potassium. Two seedlings were transplanted at each spot, at 3-5 cm depth. The transplanting was done at the spacing 90 x 30 x 30 cm (paired row planting) as to maintain the uniform plant population per hectare in all the plots.

The experiment was laid out in split plot design (Panse and Sukhatme, 1967) with three replications and placement of fertilizers as main plot treatments with five placements : F<sub>1</sub>- RDCF, band placement along the rows; F<sub>2</sub>- RDCF, application below dripper; F<sub>3</sub>- R.D., through mixed fertilizer and urea, below dripper; F<sub>4</sub>- R.D., through NPK briquettes, below dripper; F<sub>5</sub>- R.D., through soluble fertilizer/ urea (fertigation) and Poultry manure placement as sub plot treatments with four placements : M<sub>1</sub>- Band placement along the rows; M<sub>2</sub>- Band placement below lateral; M<sub>3</sub>- Placement below dripper; M<sub>4</sub>-Placement below hill.

Brinjal (cv. SUVARNA PRATIBHA) was transplanted in third week of November. All the recommended cultural practices were followed. Picking of brinjal fruits was started from last week of January to last week of March.

### RESULTS AND DISCUSSION

The results obtained from the present study as well as relevant discussion have been presented under

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following sub heads:

### Effect of placement of fertilizers:

The growth attributes (Table 1) such as number of branches, number of leaves per plant and days required for 50 % and 100 % flowering was not significantly influenced due to placement of fertilizers, except plant height in which F<sub>3</sub> (RD through mixed fertilizers and urea below dripper recorded significantly superior plant height

at 120 DAT over the treatment F<sub>1</sub> (RDCF, band placement along the rows), F<sub>4</sub> (RD through NPK briquettes below dripper) and F<sub>5</sub> [RD through soluble fertilizer and urea (fertigation)]; however, the former treatment was at par with treatment F<sub>2</sub> (RDCF application below dripper).

The yield and yield attributing characters (Table 2) such as weight of fruits per hill and weight per fruit recorded significantly higher under treatment F<sub>2</sub> (RDCF application below dripper) over the treatment F<sub>1</sub> (RDCF,

**Table 1 : Growth attributes of brinjal as influenced by different treatments at harvest**

Treatments	Plant height (cm)	Number of branches per hill	Number of leaves per hill	Days for 50 % flowering	Days for 100 % flowering
Placement of fertilizers					
F <sub>1</sub> - RDCF, band placement along the rows	76.77	17.15	43.15	52.58	65.34
F <sub>2</sub> - RDCF application below dripper	79.16	17.73	47.05	50.25	66.66
F <sub>3</sub> - RD through mixed fertilizer and urea below dripper	80.76	17.47	44.80	49.50	65.25
F <sub>4</sub> - RD through NPK briquettes below dripper	77.01	17.50	44.03	51.24	65.25
F <sub>5</sub> - RD through soluble fertilizer and urea (fertigation)	75.28	16.80	39.50	48.00	65.00
C.D. (P=0.05)	3.54	NS	NS	NS	NS
Placement of poultry manure					
M <sub>1</sub> - Band placement along the rows	80.74	18.32	47.03	52.25	67.75
M <sub>2</sub> - Band placement below lateral	76.62	17.27	41.57	54.08	68.00
M <sub>3</sub> - Placement below dripper	77.23	17.59	44.79	47.08	63.66
M <sub>4</sub> - Placement below hill	76.61	16.15	41.44	46.91	62.75
C.D. (P=0.05)	3.02	NS	3.11	2.65	4.63

NS-Non significant

**Table 2 : Yield and yield attributes of brinjal as influenced by different treatments**

Treatments	Number of fruits per hill	Weight of fruit (g hill <sup>-1</sup> )	Weight of fruit (g fruit <sup>-1</sup> )	Fruit length (cm)	Fruit yield (t ha <sup>-1</sup> )
Placement of fertilizers					
F <sub>1</sub> - RDCF, band placement along the rows	12.98	1099.33	84.49	11.06	57.26
F <sub>2</sub> - RDCF application below dripper	14.37	1338.08	93.70	11.22	66.55
F <sub>3</sub> - RD through mixed fertilizer and urea below dripper	13.18	1167.83	88.97	11.75	65.08
F <sub>4</sub> - RD through NPK briquettes below dripper	13.73	1217.25	88.63	11.25	62.83
F <sub>5</sub> - RD through soluble fertilizer and urea (fertigation)	12.27	1006.83	80.43	10.86	55.13
C.D. (P=0.05)	NS	172.25	7.60	NS	7.98
Placement of poultry manure					
M <sub>1</sub> - Band placement along the rows	12.56	1074.13	85.21	11.08	58.92
M <sub>2</sub> - Band placement below lateral	13.04	1127.33	85.32	11.11	62.35
M <sub>3</sub> - Placement below dripper	13.68	1253.47	91.97	11.05	59.02
M <sub>4</sub> - Placement below hill	13.95	1208.53	86.47	11.68	65.19
C.D. (P=0.05)	NS	118.56	NS	NS	3.92

NS-Non significant

band placement along the rows) and  $F_5$  [RD through soluble fertilizer and urea (fertigation)]; however, the former treatment was at par with treatment  $F_3$  (RD through mixed fertilizers and urea below dripper and  $F_4$  (RD through NPK briquettes below dripper). However, fruit length (cm) and the number of fruits per hill were not influenced statistically by the method of placement of fertilizers. Similar results were also reported by Shinde *et al.* (2002), Awasthe and Mishra (1987) and Kadam and Sahane (2002)

#### Effect of placement of poultry manure:

The growth characters (Table 1) *viz.*, plant height (cm), number of leaves per hill at harvest the treatment  $M_1$  (poultry manure band placement along the rows) recorded significantly superior plant height and maximum number of leaves per hill at harvest over rest of the treatment except  $M_3$  (poultry manure placement below dripper) in case of number of leaves per hill. Days required for 50 per cent and 100 per cent flowering was found significantly less in poultry manure placement below hill ( $M_4$ ) than rest of the treatments.

The yield attributing characters (Table 2) such as weight of fruit ( $g\ hill^{-1}$ ) was observed significantly higher in the treatment  $M_3$  (poultry manure placement below dripper) over the treatment  $M_1$  (poultry manure band placement along the rows) and  $M_2$  (poultry manure band placement below lateral), however, the former treatment was at par with the treatment  $M_4$  (poultry manure placement below hill). Fruit yield ( $t\ ha^{-1}$ ) was significantly higher in treatment poultry manure placement below hill

( $M_4$ ) over the treatment  $M_1$  (poultry manure band placement along the rows) and  $M_3$  (poultry manure placement below dripper); however, the former treatment was at par with the treatment poultry manure band placement below lateral ( $M_2$ ). The yield attributing characters such as fruit length (cm), number of fruits per hill and weight of fruit ( $g\ fruit^{-1}$ ) was not influenced statistically by the method of placement of poultry manure. Sendur Kumaran *et al.* (1993) Kolte *et al.* (1999) Shinde *et al.* (2002) also found similar results.

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