

## Effect of spacings and fertilizers on growth, yield and physical fruit quality of chilli (*Capsicum annuum* L.) cultivars

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### Abstract

The effect of spacings and fertilizers on growth, yield and fruit quality (physical) of chilli (*Capsicum annuum*) cultivars was studied at Bikaner (Rajasthan, India). The cultivar Local Desi recorded significantly higher plant height, dry weight per plant, weight and volume per fruit. However, cultivar NP 46 produced maximum number of fruits per plant, fruit yield per plant and fruit yield per hectare. Application of 100 kg N in combination with 25 kg P and 50 kg K per ha recorded highest fruits per plant. Maximum plant height, fresh weight and dry weight per plant, number of fruits and yield of fruits per plant were recorded in the widest spacing (55 cm x 55 cm); closest spacing (25 cm x 25 cm) produced highest fruit yield per hectare. The quality of fruits was affected by spacings. Interaction effect of spacings, fertilizers and cultivars was non significant to affect growth, yield and fruit quality attributes.

**Key words :** *Capsicum annuum*, chilli, fertilizers, spacing, yield.

### Introduction

Though the importance of balanced fertilizer application and adoption of optimum spacing in increasing the production of chilli (*Capsicum annuum* L.) is well known, no information is available on these aspects under the arid partially irrigated conditions of Western Rajasthan, a major chilli growing area in India. The present study was hence undertaken to obtain information on these

aspects and the results are reported here.

### Materials and methods

The field experiment was conducted in a farmers' field near Bikaner (Rajasthan) during *kharif* season of 1995-96. The treatments comprised of three cultivars of chilli (Local Desi, NP 46 and Jwala), four levels of nitrogen (0, 50, 75 and 100 kg/ha) with a fixed dose of 25 kg phosphorus and 50 kg potash per ha and

four spacings (25 cm x 25 cm, 35 cm x 35 cm, 45 cm x 45 cm and 55 cm x 55 cm) in 48 treatment combinations. These treatment combinations were replicated thrice and laid out in a Split Plot Design. The cultivars were taken as the main plots. Nitrogen, phosphorus and potash were applied in the form of urea, single super phosphate and muriate of potash, respectively. Nitrogen was applied in three doses -  $\frac{1}{2}$  dose before transplanting,  $\frac{1}{4}$  dose after 1 month of transplanting and remaining  $\frac{1}{4}$  dose at the time of flowering. Phosphorus and potash were drilled into the soil during field preparation. One month old seedlings of each cultivar were transplanted to the beds. Other cultural operations were carried out as per recommendations.

Vegetative growth attributes such as plant height, number of branches per plant, date of first flowering from transplanting, time of peak flowering after transplanting and fresh weight and dry weight per plant were recorded. Yield attributes such as number of fruits per plant, yield per plant and yield per hectare and physical fruit quality parameters such as fruit length, volume of fruit and average fruit weight were also recorded.

## Results and discussion

### *Effect of cultivars on growth, yield and fruit quality*

Wide variability was observed among the cultivars for various attributes (Tables 1 & 2). The cultivar Local Desi recorded significantly higher plant height (53.1 cm), fresh weight per plant (99.2 g) and fruit volume (7.2 ml), and delayed flowering as compared to NP 46. The cultivar NP 46 produced maxi-

mum number of fruits per plant (52.8), fruit yield per plant (94.0 g) and fruit yield per hectare (76.6 q). The cultivar Local Desi probably due to its less branching, less fruiting and erect habit resulted in taller plants rendering more fresh weight and dry weight per plant.

### *Effect of fertilizers on growth, yield and fruit quality*

Fertilizer doses were effective in significantly affecting the number of fruits per plant, yield per plant, yield per hectare, average weight and volume of fruit (Table 2). The maximum fruits per plant (46.7), fruit yield per plant (99.5 g), fruit yield per hectare (110.9 q), fruit weight (3.3 g) and volume of fruit (5 ml) were recorded under 100 kg  $N_2$  + 25 kg  $P_2O_5$  + 50 kg  $K_2O$  treatment. The increased number of fruits per plant and average fruit weight was possible due to liberal supply of nitrogen with balanced fertilization (Gill *et al.*, 1974) which ultimately increased yield of chilli per plant and per hectare, weight and volume of fruit.

### *Effect of spacings on growth, yield and fruit quality*

Spacing significantly influenced plant height, days to first flowering, fresh and dry weight per plant, number of fruits and yield per plant (Table 1). The widest spacing (55 cm x 55 cm) recorded highest plant height (49.3 cm), fresh weight (86.9 g/plant), dry weight (21.8 g/plant), number of fruits (49.0/plant) and fruit yield (110.4 g/plant). However, closest spacing (25 cm x 25 cm) recorded the maximum fruit yield (115.0 q per ha) (Table 2). No significant effect of spacing on length, weight and volume of fruit was observed as reported by Szepesy (1974). All interaction effects

**Table 1.** Effect of cultivars, fertilizers and spacings on vegetative growth attributes in chilli

Treatment	Plant height (cm)	No. of branches/plant	Days to first flowering	Days to peak flowering	Fresh weight/plant (g)	Dry weight/plant (g)
<i>Cultivar</i>						
NP 46	42.2	5.6	52.3	77.6	65.8	16.4
Jwala	41.0	5.3	53.8	78.2	65.2	16.3
Local Desi	53.1	5.1	57.7	77.7	99.2	24.8
SEm $\pm$	1.7	0.7	2.6	0.4	6.9	1.7
CD at 5%	4.6	NS	NS	NS	19.3	4.8
<i>Fertilizer (kg/ha)</i>						
100 N <sub>2</sub> + 25 P <sub>2</sub> O <sub>5</sub> + 50 K <sub>2</sub> O	45.5	5.3	52.6	78.1	75.5	18.8
75 N <sub>2</sub> + 25 P <sub>2</sub> O <sub>5</sub> + 50 K <sub>2</sub> O	46.1	5.3	52.3	77.8	83.5	20.8
50 N <sub>2</sub> + 25 P <sub>2</sub> O <sub>5</sub> + 50 K <sub>2</sub> O	45.8	5.2	53.5	78.0	78.8	19.2
Control (No fertilizer)	44.2	5.0	54.7	77.1	76.3	19.5
SEm $\pm$	1.3	0.2	0.9	0.3	5.5	1.5
CD at 5%	NS	NS	NS	NS	NS	NS
<i>Spacing</i>						
25 cm x 25 cm	43.0	5.6	50.0	77.8	73.8	18.5
35 cm x 35 cm	44.1	5.4	53.2	77.9	74.1	18.5
45 cm x 45 cm	45.2	5.1	54.7	77.9	74.4	18.6
55 cm x 55 cm	49.3	5.0	53.3	77.9	86.9	21.8
SEm $\pm$	1.3	0.2	0.9	0.3	5.5	1.5
CD at 5%	2.6	NS	1.9	NS	10.9	3.1

NS = Non significant

**Table 2.** Effect of cultivars, fertilizers and spacings on yield and fruit quality parameters in chilli

Treatment	No. of fruits/ plant	Yield/ plant (g)	Yield/ ha (q)	Fruit length (cm)	Fruit weight (g)	Fruit volume (ml)
<i>Cultivar</i>						
NP 46	52.8	94.0	76.6	8.5	2.0	3.1
Jwala	50.6	89.7	75.0	8.3	1.9	2.9
Local Desi	27.2	91.4	75.9	8.9	5.1	7.2
SEm ±	7.2	16.4	11.9	0.3	0.4	0.9
CD at 5%	19.9	NS	NS	NS	1.0	2.6
<i>Fertilizer (kg/ha)</i>						
100 N <sub>2</sub> + 25 P <sub>2</sub> O <sub>5</sub> + 50 K <sub>2</sub> O	46.7	99.5	110.9	8.7	3.3	5.0
75 N <sub>2</sub> + 25 P <sub>2</sub> O <sub>5</sub> + 50 K <sub>2</sub> O	46.1	97.6	81.2	8.8	3.1	4.6
50 N <sub>2</sub> + 25 P <sub>2</sub> O <sub>5</sub> + 50 K <sub>2</sub> O	44.2	93.8	75.0	8.6	3.1	4.5
Control (No fertilizer)	39.6	75.9	65.6	8.5	3.0	4.1
SEm ±	3.2	6.1	7.8	0.1	0.1	0.2
CD at 5%	6.5	12.2	15.7	NS	0.2	0.5
<i>Spacing</i>						
25 cm x 25 cm	39.9	78.6	115.0	8.8	2.7	4.8
35 cm x 35 cm	41.7	82.9	59.4	8.7	2.9	4.2
45 cm x 45 cm	46.0	94.9	53.1	8.5	3.0	4.5
55 cm x 55 cm	49.0	110.4	34.4	8.6	2.9	4.3
SEm ±	3.2	6.1	7.8	0.1	0.1	0.2
CD at 5%	6.5	12.2	15.7	NS	NS	NS

NS = Non significant

were non-significant. On the basis of the present experiment, it may be recommended that cultivation of the chilli cultivar NP 46 with a planting distance of 25 cm x 25 cm and application of 100 kg nitrogen in combination with 25 kg phosphorus and 50 kg potash per ha may give optimum fruit yield under the arid partially irrigated conditions of western Rajasthan.

### **References**

- Gill H S, Thakur P C & Thakur T C  
1974 Effect of nitrogen and phosphorus application on seed yield of sweet pepper. *Indian J. Hort.* 31 : 74-78.
- Szepesy K 1974 The optimal spacing for the spice capsicum cultivars. *Intezet Bulle Tinje* 9 : 151-154.