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**Satodiya BN**
Department of Horticulture, B. A. College of Agriculture, AAU, Anand, Gujarat, India

**Bhatt AH**
Department of Horticulture, B. A. College of Agriculture, AAU, Anand, Gujarat, India

**Maheriya PA**
Department of Horticulture, B. A. College of Agriculture, AAU, Anand, Gujarat, India

**Shah NI**
Department of Horticulture, B. A. College of Agriculture, AAU, Anand, Gujarat, India

**Corresponding Author:**
**Satodiya BN**
Department of Horticulture, B. A. College of Agriculture, AAU, Anand, Gujarat, India

# Effect of plant geometry on growth and yield of capsicum under open ventilated poly house

**Satodiya BN, Bhatt AH, Maheriya PA and Shah NI**

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**Abstract**
An investigation was carried out to study the effect of six different plant geometry on growth and yield parameters of capsicum under open ventilated poly house at Horticultural Research Farm, B. A. College of Agriculture, Anand Agricultural University during 2016-17 and 2017-18. Healthy seedlings were transplanted in a plot size of 5.4 m x 2.8 m i.e. 15.12 $m^2$in six different plant geometry i.e. $T_1$: 45 × 30 cm, $T_2$: 45 × 45 cm, $T_3$: 45 × 60 cm, $T_4$: 60 × 30 cm, $T_5$: 60 × 45 cm and $T_6$: 60 × 60 cm. Results of the experiment showed that maximum picking was obtained in plant geometry 45 x 30 cm and 60 x 30 cm. Whereas, the highest number of fruits per plant were recorded in plant geometry 45 x 60 cm and 45 x 30 cm. The highest yield kg/plant was obtained in plant geometry 45 x 60 cm. However, maximum yield (kg/plot and q/1000 $m^2$) was recorded in plant geometry 45 x 30 cm. Thus, plant geometry 45 x 30 cm is most suitable for cultivation of capsicum under open ventilated poly house for getting higher yield.

**Keywords:** Plant geometry, capsicum, poly house, yield

## Introduction
Capsicum (*Capsicum annum* var. Grossum) belongs to the family Solanaceae. It is an important member of chilli group. It is variously called as capsicum, green pepper, sweet pepper, bell pepper etc. Capsicum attained a status of high value low volume crop in India and occupies a place of pride among vegetables in Indian cuisine, because of its delicacy and pleasant flavour coupled with rich content of ascorbic acid along with other vitamins and minerals. Cultivation of capsicum under protected structure is gaining momentum because it can produce throughout the year.

Considering its high nutritive value and utility. It is imperative to take attempts for its successful cultivation under open ventilated poly house, which is depends on several factors among them, plant geometry is one of the important aspects for production system of capsicum. There is no recommendation or report regarding the optimum geometry to cultivate the capsicum under the open ventilated poly house conditions in Gujarat. Considering the above facts, the present experiment was under taken to standardize the suitable plant geometry for getting higher yield.

## Materials and Methods
An experiment was conducted in open ventilated poly house at the Horticulture Research Farm, B. A. College of Agriculture, AAU, Anand during 2016-17 and2017-18. Indra variety of capsicum was selected for the experiment. Plug trays were used to raise seedlings for both years under open ventilated poly-house conditions. The experiment was laid out in Completely Randomized Design with four repetitions. During second week of October, 30 days old healthy seedlings were transplanted in a plot size of 5.4 m x 2.8 m i.e. 15.12 $m^2$in six different plant geometry i.e. $T_1$: 45 × 30 cm, $T_2$: 45 × 45 cm, $T_3$: 45 × 60 cm, $T_4$: 60 × 30 cm, $T_5$: 60 × 45 cm and $T_6$: 60 × 60 cm which were grouped in three plant density i.e. 4762, 3175 and 2381 plants/1000 $m^2$ based on their plant to plant spacing such as 30 cm, 45 cm and 60 cm. All recommended standard agronomical package of practices were followed such as fertigation and IPM. The data of growth and yield parameters were recorded from randomly selected five tagged plants from each net plot.

## Results and Discussion

### Growth parameters

The data pertaining to growth parameters *viz.* number of branches at 30, 60 and 90 DATP, days to initiation of flowering and 50% flowerings as well as days to first harvest are presented in Table 1 which showed non-significant difference among the plant geometry.

**Table 1:** Effect of plant geometry on growth parameters (Pooled of two years)

| Treatments | Number of branches per plant at | | | Days to initiation of flower | Days to 50% flowering | Days to first harvest |
|---|---|---|---|---|---|---|
| | 30 DATP | 60 DATP | 90 DATP | | | |
| $T_1$ 45 x 30 cm | 4.68 | 10.78 | 17.65 | 32.14 | 42.05 | 76.64 |
| $T_2$ 45 x 45 cm | 4.98 | 10.55 | 16.99 | 32.28 | 43.35 | 77.08 |
| $T_3$ 45 x 60 cm | 5.08 | 9.95 | 17.17 | 33.84 | 42.68 | 76.50 |
| $T_4$ 60 x 30 cm | 4.98 | 10.88 | 17.50 | 33.55 | 43.55 | 77.73 |
| $T_5$ 60 x 45 cm | 5.05 | 10.05 | 16.83 | 33.01 | 43.29 | 77.60 |
| $T_6$ 60 x 60 cm | 5.03 | 10.05 | 17.17 | 34.00 | 43.28 | 77.78 |
| S. Em. ± | 0.19 | 0.30 | 0.59 | 0.61 | 0.37 | 0.78 |
| C. D. at 5% | NS | NS | NS | NS | NS | NS |

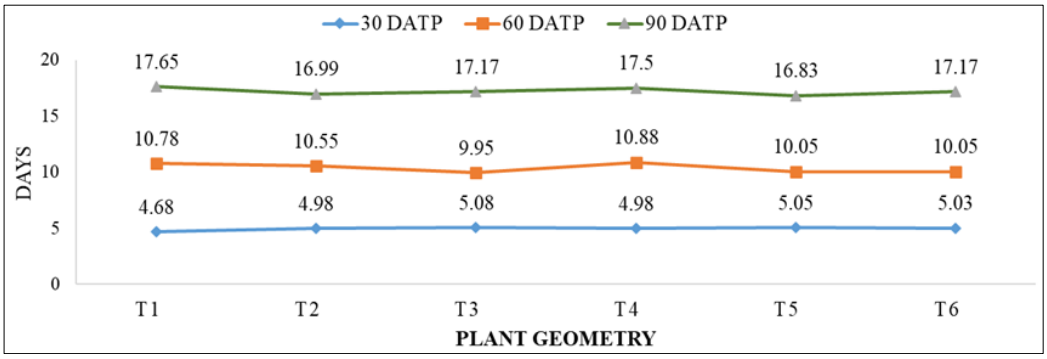


**Fig 1:** Number of Braches at 30, 60 and 90 DATP

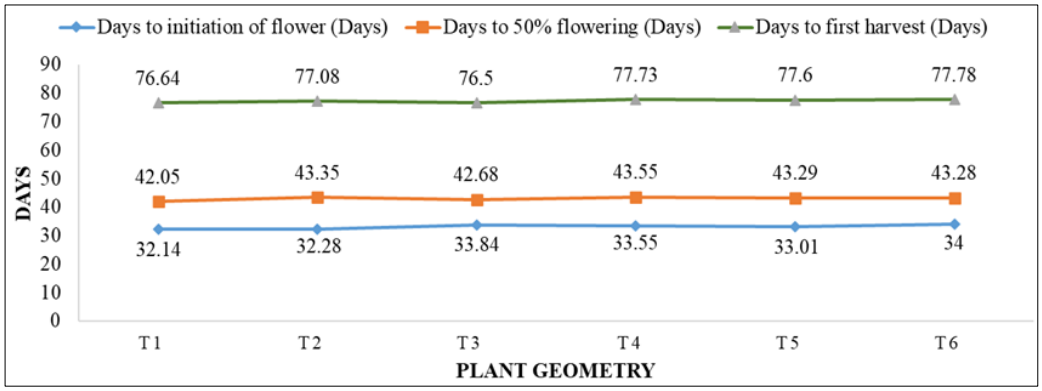


**Fig 2:** Days to initiation of flowering, 50% flowering and first harvest

### Yield parameters

Data furnished in table 2 indicate that among the yield parameters, fruit girth and length observed non-significant difference whereas, number of picking, number of fruits/plant, yield (kg/plant, kg/plot and q/1000 $m^2$) found significant difference between different plant geometry.

**Table 2:** Effect of plant geometry on yield parameters and yield (Pooled of two years)

| Treatments | Number of pickings | Fruit girth (cm) | Fruit length (cm) | Number of fruits/plant | Yield (kg/plant) | Yield (kg/plot) | Yield (q/1000 $m^2$) |
|---|---|---|---|---|---|---|---|
| $T_1$ 45 x 30 cm | 8.75 | 22.46 | 9.64 | 18.54 | 1.91 | 137.58 | 97.99 |
| $T_2$ 45 x 45 cm | 7.65 | 22.45 | 9.52 | 17.02 | 1.98 | 95.03 | 67.69 |
| $T_3$ 45 x 60 cm | 7.21 | 22.50 | 9.76 | 19.23 | 2.38 | 85.79 | 61.10 |
| $T_4$ 60 x 30 cm | 8.70 | 22.65 | 9.69 | 14.14 | 1.55 | 111.61 | 73.82 |
| $T_5$ 60 x 45 cm | 6.99 | 21.96 | 9.33 | 16.82 | 2.08 | 99.69 | 65.94 |
| $T_6$ 60 x 60 cm | 7.58 | 21.72 | 9.31 | 16.06 | 2.17 | 77.98 | 51.58 |
| S.Em. ± | 0.21 | 0.34 | 0.26 | 0.72 | 0.05 | 2.66 | 1.76 |
| C. D. at 5% | 0.61 | NS | NS | 2.07 | 0.15 | 7.63 | 5.05 |

### Number of picking

Maximum numbers of picking (8.75) was recorded with treatment$T_1$ (45 x 30 cm) which remained at par with treatment $T_4$ (60 x 30 cm) i.e. 8.70.This might be due to the more numbers of plant per unit area which required frequent picking operation. Similar, results also obtained by Prasad (2001) [5] in capsicum.

**Number of fruits/plant**

Maximum number of fruits per plant (19.23) was observed in treatment $T_3$ (45 x 60 cm), but it was at par with treatment $T_1$ (45 x 30 cm) i.e. 18.54.This might be due to proper utilization of space and nutrients resultant vigorous and healthy plant and ultimately more number of fruits per plant. Similar, result was also recorded by Manchanda *et al.* (1988) [4] in capsicum.

**Yield (kg/plant)**

Maximum yield 2.38kg/plant was recorded with treatment $T_3$ (45 x 60 cm).The wider plant density produced more vigorous crops than at closer density. The result of the experiment is in agreement with the findings of Edgar *et al.* (2017) [2], who also recorded the highest yield of capsicum with the closest plant density. Similar, results were also reported by Rodriguez *et al.* (2008) [6] and Manchanda *et al.* (1988) [4] in capsicum and Bhattarai *et al.* (2015) [1] in cherry tomato.

**Yield (kg/plot and q/1000 $m^2$)**

Maximum yield (kg/plot and q/1000 $m^2$) was observed in treatment $T_1$ (45 x 30 cm) i.e. 137.58 kg/plot and 97.99 q/1000 $m^2$.This might be due to more number of plant accommodate per unit area. Similar, results were also recorded by Prasad (2001) [5], Manchanda *et al*. (1988) [4] and Malshe *et al.* (2016) [3] in capsicum and Bhattarai *et al*. (2015) [1] in cherry tomato.

**Conclusion**

From the results obtained it can be concluded that for getting maximum number of fruits/plant and higher yield, planting of capsicum cv. Indra should be done at 45 x 30 cm in open ventilated poly house.

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