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RESEARCH NOTE

Effect of planting geometry and training methods on yield of cherry tomato grown under shade house

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An experiment was carried out to study the effect of planting geometry and training methods on yield of cherry tomato variety HAT-121 under 35 per cent shade house during *kharif* season of 2014-15 at Hi-Tech Horticulture unit, University of agricultural Sciences, Dharwad. The experiment was comprised of three levels of spacing and four levels of training with factorial randomized block design. The experimental results revealed that maximum yield per cluster (131.02 g) and fruit yield per plant (3.50 kg) were recorded in wider spacing S_3 (45 × 60 cm). The maximum yield per m^2 (7.48 kg m^{-2}) was observed in closer spacing S_1 (45 × 30 cm). The maximum fruit yield per plant (3.78 kg) and yield per m^2 (7.49 kg m^{-2}) were recorded in T_4 (four stems). The maximum yield per cluster (145.20 g) was exhibited by T_1 (single stem) training system.

Keywords*:* Cherry tomato, Shade house, Spacing

Introduction

Cherry tomato (*Solanum lycopersicum* var. *cerasiforme*) is a warm season crop and requires long growing periods to reap more harvests, it is the most promising crop under protected structures as a small fruited variety of tomato and generally considered to be similar but not identical to the wild precursor of the domestic tomato. It is characterized by small size fruits, with a bright red colour resembling a cherry, having an excellent taste (Charlo *et al.,* 2007). Cherry tomato is becoming popular in the retail chains and marketed at a premium price compared to regular tomatoes. It is joining the growing market of mini vegetables and is one of the most promising in the line of differentiated products. It is considered as an exotic vegetable, bringing new taste and appearance to dishes.

Plant density and pruning of side shoots play a key role in efficient use of the area inside protected structures. Optimum plant spacing may help in efficient utilization of land and solar radiation (PAR) for obtaining good quality of fruits and yield (Charlo *et al.,* 2007; Ara *et al.,* 2007; Amundson *et al.,* 2012; Mantur *et al.,* 2014). On the other hand, stem pruning influences the quality and productivity of fruits by influencing the light utilization pattern as well as source-sink balance (Cockshull *et al.,* 2001; Franco *et al.,* 2009; Kumar *et al.,* 2014).

However, the works on growing cherry tomato under shade house are meagre. Hence, the study was initiated to find out suitable spacing and training methods in cherry tomato grown under shade house.

The experiment was conducted under shade house established with 35 per cent shade net at Hi-Tech Horticulture Unit, University of Agricultural Sciences, Dharwad during *kharif* season of 2014-15. The seedlings of cherry tomato variety HAT-121 (indeterminate) were planted in two rows on one m wide bed leaving 50 cm path between two beds. The treatments consisted of three spacing *i.e.,* 45 cm × 30 cm (S_1), 45 cm × 45 cm (S_2) and 45 cm × 60 cm (S_3) with training systems are single stem, double stem, three stems and four stems. During the growing period at every 10 to 15 days interval all side shoots were pruned in pruning treatment. Plants were trained along the plastic thread tide to galvonised iron wire stretched over head along the bed. The experiment was laid out in a factorial randomized block design with three replications. The observations were recorded on yield per cluster, fruit yield per plant and per m².

Data (Table 1) revealed that maximum yield per cluster (131.02 g) w*as* recorded at widest spacing *i.e.,* treatment S_3 (45 × 60 cm) compare to other. This might be due to more fruit set, more photosynthesis as it produces more plant height at wider spacing. These findings are in accordance with the findings of Rajendra *et al.* (2013) in tomato and Singh and Kumar (2005) in cherry tomato. The maximum yield per cluster (145.20 g) was observed in T_1 (single stem) compares to other. The results of increased average fruit weight by pruning side shoots was in conformity with the findings of Mantur and Patil (2008) in tomato. However, the interaction effect with respect to yield per cluster was found non-significant. The fruit yield per plant was significantly more (3.50 kg) in S_3 (45 × 60 cm) compared to other spacing treatments (Table 2). Similarly, Mantur and Patil (2008) also reported that tomato yield per plant (60 × 60 cm) compared to (60 × 45 cm). With respect to training systems the fruit yield per plant was significantly more with four stem training system (3.78 kg) compared to single stem (2.50 kg). The increased yield per plant due to training

Table 1. Yield per cluster (g) as influenced by planting geometry and training methods on cherry tomato under shade house condition

Training systems	Yield per cluster (g) Spacing S_1 (45 × 30 cm)	S_2 (45 × 45 cm)	S_3 (45 × 60 cm)	Mean
T_1 (Single stem)	133.90	150.50	151.30	145.20
T_2 (Double stem)	129.80	131.50	133.50	131.59
T_3 (Three stems)	118.30	119.00	123.60	120.31
T_4 (Four stems)	109.60	115.20	115.70	113.50
Mean	122.89	129.04	131.02	
For comparison of		S.Em ±		C.D. (P = 0.05)
Spacing		3.29		9.68
Training		3.80		11.17
Interaction		6.59		42.09

Table 2. Yield per plant (kg) as influenced by planting geometry and training methods on cherry tomato under shade house condition

Training systems	Yield per cluster (g)			Mean
	Spacing			
	S_1 (45 × 30 cm)	S_2 (45 × 45 cm)	S_3 (45 × 60 cm)	
T_1 (Single stem)	2.40	2.50	2.70	2.50
T_2 (Double stem)	2.80	2.90	3.20	2.97
T_3 (Three stems)	3.20	3.20	4.10	3.51
T_4 (Four stems)	3.50	3.80	4.10	3.78
Mean	2.98	3.08	3.50	
For comparing means of		S.Em±		C.D. (P= 0.05)
Spacing		0.12		0.33
Training		0.13		0.38
Interaction		0.67		1.94

Table 3. Yield per m² (kg) as influenced by planting geometry and training methods on cherry tomato under shade house condition

Training systems	Yield per cluster (g)			Mean
	Spacing			
	S_1 (45 × 30 cm)	S_2 (45 × 45 cm)	S_3 (45 × 60 cm)	
T_1 (Single stem)	7.20	6.70	6.40	6.80
T_2 (Double stem)	7.20	7.00	6.90	7.04
T_3 (Three stems)	7.80	7.40	7.30	7.49
T_4 (Four stems)	7.70	7.20	7.50	7.49
Mean	7.48	7.08	7.05	
For comparing means of		S.Em±		C.D. (P = 0.05)
Spacing		0.12		0.33
Training		0.13		0.38
Interaction		0.49		1.44

may be due to the increased average fruit weight. The interaction effects were found to be non-significant. The significantly higher yield per m² (7.48 kg m⁻²) was recorded in closer spacing S_1 (45 × 30 cm) and it was followed by S_2 (45 × 45 cm) and least yield was recorded in S_3 (7.05 kg m⁻²) wider (Table 3). In pepper grown under glasshouse, similar results were reported by Dasgan and Abak kazim (2003) who opined that as the plant density increased the early and total yield. Similarly, in tomato grown under shade house increased yield per m² with closer spacing was reported by Mantur and Patil (2008). Among the method of training, the maximum yield per m² (7.49 kg m⁻²) was observed in T_4 (four stems), which was at par with T_3 (triple stems). The present results are supported by the finding of Mazed *et al.* (2015) and Alsadon *et al.* (2013) in tomato.

Cherry tomato Cv. HAT-121 gave better response to spacing and training levels. For yield point of view the closer spacing S_1 (45 × 30 cm) with training system of four stems were found better for cherry tomato but with respect economic, quality and export the wider spacing (45 × 60 cm) with training of double stems was found better.

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