



Cultivation of Tomato under Protected Structures: Need of Hour

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Abstract: Current study conducted to investigate the cultivation practices followed by respondents growing tomato under poly house in six district of Punjab. In main season, glut of vegetable arises in the market which lowers down the price. Due to shortage of processing industry and storage infrastructure, off season vegetable is the viable option to enhance the income and quality of produce. The majority of the respondents (57.90 %) sown the tomato crop before the recommended and 21.05 per cent of respondents sown the crop at recommended time. Whereas 21.05 per cent of respondents sown the tomato crop after the recommended time under protected structures. The 68.43 per cent of the respondents grown their own nursery for tomato crop out of which 38.46 per cent grown nursery directly in field and 61.54 per cent used plug trays to grow the nursery. The 31.57 per cent of the respondents did not grown the nursery and purchased the seedlings. The transplanting of the seedling delayed by 26.31 per cent of the respondents whereas 21.05 per cent of the respondents reported early transplanting before the recommended time in tomato capacity.

Keywords: Tomato, Protected structures

India is the second largest producer of vegetables in the world, next to China. Area under vegetable cultivation in India is 9465.30 thousand hectare with production of 168502.90 thousand tonnes and productivity of 17.80 metric tonnes per hectare (Anonymous 2016). In Punjab, area under vegetable cultivation is 208 thousand hectare with production of 4167.60 thousand tonnes and productivity of 15.60 metric tonnes per hectare (Anonymous 2016). To feed the present population of the state, there is a need to double the total production of vegetables. Productivity of vegetables in India is quite low beside it is second largest producer of vegetables. This may be due to high labour requirement in vegetable cultivation, no minimum support price on vegetables has been fixed by govt, glut in main season, poor quality of produce, high cost of seed and no marketing yard near field. Hence, there is need to enhance the production and productivity of vegetable crops through modified strategies to meet the appropriate quantity of vegetables in diet. Olericulturist and extension specialists will have to do some efforts together to achieve the desired level of production potential (George and Singh 2006). Protected cultivation is one of the best technologies to enhance the production, quality and productivity of vegetable crops.

Protected cultivation technology is a technique in which plant microclimate is partially or fully controlled artificially as per the requirement of specific crops to improve the yield potential of crop and to alleviate one or more abiotic stress for optimum growth of crop plants (Satyasai and Viswanathan 1996). In cool season, farmers can raise early crops of better quality with high yield under protected structures to increase

their income by following recommended cultivation practices. To ascertain the adoption of recommended cultivation practices in tomato crop, this study has been planned.

MATERIAL AND METHODS

The present study was conducted in Punjab state. Six districts i.e. Amritsar, Gurdaspur, Sangrur, Moga, Jalandhar and Kapurthala were selected purposively. A list of total vegetable growers in selected districts was prepared with the help of department of horticulture. From this list 150 farmers who have adopted protected vegetable cultivation were selected and contacted according to probability proportion of number of farmers doing protected vegetable cultivation in different districts. An interview schedule was designed by consulting relevant literature for data collection. It dealt with the statements to know the cultivation practices followed by the farmers in tomato crop under protected structures. The data were collected personally by the researcher by visiting the study area and interviewing the respondents. For receiving the response of respondents, the investigator contacted them personally in their villages. The data were analyzed with the help of statistical tools such as frequencies, percentage methods.

RESULTS AND DISCUSSION

Sowing practices followed in tomato crop under protected cultivation: Data presented in Table 1 depict that majority of the respondents i.e. 57.90 per cent sown the tomato crop before the recommended time while, 21.05 per cent of respondents sown the crop at recommended time. Whereas 21.05 per cent of respondents sown the tomato

crop after the recommended time under protected structures. Similar results were reported by Sharma (2002b) in okra cultivation under open field cultivation.

Data in Table 1 further depicted that 61.54 per cent of respondents used less than recommended seed rate followed by 38.46 per cent sown with more than recommended seed rate of tomato crop. None of the respondent had sown the tomato crop with recommended seed rate under protected structures. Similar results were reported by Khangura and Arneja (2003).

It can be further seen from Table 1 that 68.43 per cent of the respondents grown their own nursery for tomato crop out of which 38.46 per cent grown nursery directly in field and 61.54 per cent used plug trays to grow the nursery. Data further showed that 31.57 per cent of the respondents did not grown the nursery and purchased the seedlings, out of which half of the respondents used recommended number of seedling while remaining half used less than recommended number of seedlings.

To know whether the respondents were maintaining the recommended spacing, respondents were asked about spacing between the plants and rows. The findings of the study revealed that only 15.79 per cent of respondents sown the crop at recommended spacing while, 57.89 per cent of respondents sown tomato at more than recommended spacing while 26.32 per cent of them were sown the crop at less than recommended spacing under protected structures. Similar results were reported by Schreinemachers et al (2016) in tomato crop under protected structures.

Data presented in Table 1 showed that majority of the respondents (69.23%) sown pre treated seeds of tomato crop while 30.77 per cent of them followed seed treatment with recommended chemicals under protected structures. Similar results were reported by Hakim (1998).

Transplanting of the seedling delayed by 26.31 per cent of the respondents and majority of respondents (52.64%) transplanted the tomato under protected structures at recommended time whereas 21.05 per cent of the

Table 1. Distribution of respondents according to sowing practices followed in tomato under protected cultivation

Crop	Sowing practices	Practices followed	Frequency (%)
Tomato	Nursery raising	Yes	102 (68.43)
		No	48 (31.57)
	Method of nursery raising (n=102)	Field	39 (38.46)
		Plug tray	63 (61.54)
	Seed rate (n=102)	Less than recommended (75 g/acre)	63 (61.54)
		Recommended (100g/acre for tomato)	-
		More than recommended (200g/acre)	39 (38.46)
	Seedling rate (n=32)	Less than recommended (8000 seedlings/acre)	16 (50.00)
		Recommended (10000seedlings/acre)	16 (50.00)
	Seed Treatment (n=102)	Treatment done	31 (30.77)
		Recommended (Captain or Thiram @ 3 g per Kg or Bavistin @ 2 g/Kg)	
		Purchased pre treated seed	71 (69.23)
	Sowing time	Before recommended time (Poly house and Net house: August, Low tunnel: August to September)	88 (57.90)
		Recommended time (Poly house and Net house: Mid September-mid October, Low tunnel: October)	31 (21.05)
		After recommended time (Poly house and Net house: 1 st week of November, Low tunnel: November)	31 (21.05)
	Spacing	Less than recommended (Plant to Plant 30 cm and Row to Row 40 cm and Bed to Bed 80 cm)	39 (26.32)
		Recommended (Plant to Plant 30 cm and Row to Row 60 cm and Bed to Bed 90 cm)	24 (15.79)
		More than recommended (Plant to Plant 45 cm and Row to Row 45 cm and Bed to Bed 1.6 m)	87 (57.89)
	Transplanting time	Before recommended time (Poly house and Net house: August to end September, Low tunnel: October)	31 (21.05)
		Recommended time (Poly house and Net house: Mid October-mid November (40-45 DAS), Low tunnel: November)	80 (52.64)
		After recommended time (Poly house and Net house: 1 st week of December, Low tunnel: End December-January)	39 (26.31)

Table 2. Distribution of respondents according to irrigation practices followed under protected cultivation of tomato crop

Irrigation	Category	Tomato (n=150)	
		Frequency	Percentage (%)
Methods of irrigation	Drip	126	84.21
	Furrow	24	15.79
Irrigation interval	Less than recommended (every day through drip and after 2-3 day through furrow)	63	42.11
	Recommended (2 day interval through drip and after 5-7 days through furrow)	87	57.89
	More than recommended (3-4 day interval through drip and 8-10 day interval through furrow)	-	-

Table 3. Distribution of respondents according to time of harvesting under protected cultivation of vegetables

Crop	Time of harvesting	Frequency	Percentage
Tomato (n=150)	Before the recommended time (First week of February, 55-70 DAT)	110	73.68
	At recommended time (Last week of February, 70-80 DAT)	32	21.06
	After recommended time (mid March 85-90 DAT)	8	5.26

respondents reported early transplanting before the recommended time in tomato (Table 1).

Irrigation practices followed under protected cultivation of tomato crop: The data in the Table 2 reveal that majority of the respondent (84.21%) were following drip method of irrigation while 15.79 per cent of them were following furrow irrigation in tomato crops under protected structures. Table 2 further indicated that majority of the respondents (57.89%) were following recommended irrigation interval while 42.11 per cent of respondents were following less than recommended irrigation interval in tomato crop respectively under protected structures.

It can be seen from data in Table 2 that maximum number of respondents adopted drip method of irrigation and apply irrigation at recommended interval under protected cultivation of vegetables.

Time of harvesting for different crops under protected cultivation of vegetables: Data presented in Table 3 indicate that majority of respondents (73.68%) harvested the tomato crop before recommended time while 21.06 per cent of respondents harvested crop at recommended time. Whereas five per cent of respondents harvested the tomato crop after the recommended time of harvesting (Table 3). Tomato crop was harvested before recommended time under protected structures by maximum number of respondents.

CONCLUSION

It can be concluded that under protected cultivation few of respondents sown the crop at recommended spacing while

majority of respondents sown tomato at more than recommended spacing while one fourth of them were sown the crop at less than recommended spacing under protected structures. Similar results were reported by Schreinemachers et al (2016) in tomato crop under protected structures. It can also concluded that maximum number of respondents adopted drip method of irrigation and apply irrigation at recommended interval under protected cultivation of vegetables. So, training camps should be organized to train the labourers for successful cultivation of vegetable crops under protected vegetable technologies.

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