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Study on biometric characteristics of tomato grown in poly greenhouse and open field conditions

M. GANESAN AND H.D. SUBASHINI

JRD Tata Ecotechnology Centre, M.S.Swaminathan Res. Foundation, Chennai - 600 113, Tamil Nadu

Abstract: A study on biometric characteristics of tomato (cv. Vaishali) grown in uncontrolled poly-greenhouse was studied. Changes in height, number of leaves, number of nodes and number of branches of tomato during the growth period and yield were observed at 7 days interval throughout the growth period. The results compared the performance of the crop grown in open field (control) condition. The results revealed that performance of the crop grown inside the poly-greenhouse (2985.97 g/plant) was comparatively better than that grown in open condition (819.94 g/plant) and the increase was nearly 3½ times higher in fruit yield (*Key words: Poly house, Tomato*)

Tomato is one of the important vegetable crops grown throughout India. The annual production of tomatoes in the world is 5.4 million metric tonnes and in India it is 0.78 million metric tonnes. However, its productivity in Tamil Nadu is less (FAO, 1983). Greenhouse cultivation could, therefore, be resorted to increase the tomato production. Greenhouses are framed structures covered with transparent or translucent material and large enough to grow crops with partial or fully controlled environmental conditions to get maximum productivity and quality produce. Polyethylene/plastic film covered greenhouses are being widely used in recent years throughout the world. While tomatoes grown in the open field reach yields of 60-80 tonnes per hectare, approximately about 250-300 tonnes can be obtained in greenhouses under controlled climatic conditions. The primary advantages with greenhouses are that any crop can be grown in any season of the year depending on the market demand, excellent quality of the produce, disease free produce etc. The yield of okra in greenhouse

was 2.5 to 3 times higher as per Nimje (1991) and nearly 1.5 times higher according to More (1996) compared to the yield obtained in open field cultivation. The temperature in polygreenhouse is 4-5°C higher than that in the open field. This study was conducted to examine the morphological characteristics and yield performance of tomato both in greenhouse as well as open field conditions.

Materials and Methods

The hybrid variety 'Vaishali' of tomato was grown under greenhouse and open field conditions during 1998 - 99. A gable roof shape of 5m length x 3m width with four side walls was erected and triangular portion of the roof was covered by nylon net (25% shade) to facilitate ventilation and remaining portion (rectangular) of the roof was covered by UV sheet of 200 micron thickness. The open field was prepared proportionate to the length of greenhouse with a plot size of 5m x 3m. One month old seedlings

Table 1. Biometric characteristics of tomato variety of vaishali

Days after trans- planting	Height (cm)		Leaves (no.)		Branches (no.)		Nodes (no.)	
	Poly greenhouse	Control plot	Poly greenhouse	Control plot	Poly greenhouse	Control plot	Poly greenhouse	Control plot
7	9.62	9.05	9.5	7.37	2.3	1.73	2.97	2.97
14	15.67	13.13	20.5	18.4	4.10	3.53	5.40	5.53
21	27.28	21.5	37.37	32.07	6.97	5.83	8.23	8.3
28	42.88	33.63	63.57	49.7	14.83	14.27	11.5	11.27
35	61.03	48.57	108.23	77.63	26.43	24.03	14.23	13.97
42	71.3	58.37	160.6	128.17	42.3	36.93	16.53	16.37
49	80.53	66.47	242.17	183.6	72.67	58.73	18.33	18.1
56	83.03	68.5	281.00	207.93	83.7	63.97	19.00	18.4
63	84.1	68.8	316.17	237.87	99.97	74.00	19.27	18.87
70	84.10	69.03	353.33	241.57	114.2	77.97	19.37	18.9
77	84.10	69.03	350.33	205.17	111.43	66.87	19.37	18.9
84	84.10	69.03	245.10	134.83	75.9	46.93	19.37	18.9
91	84.10	69.03	123.07	81.6	38.73	26.4	19.37	18.9

Table 2. Yield of fruits from various pickings per plant

Sl.No.	Date	Poly greenhouse (gms / plant)	Control plot (gms / plant)
1.	5.4.'99	65.00	0
2.	10.4.'99	358.00	33.75
3.	13.4.'99	293.13	71.25
4.	15.4.'99	260.00	105.56
5.	19.4.'99	649.00	97.50
6.	23.4.'99	211.11	107.14
7.	27.4.'99	256.67	166.88
8.	1.5.'99	493.89	120.00
9.	6.5.'99	399.17	117.86
	Total	2985.97	819.94

of tomato ('Vaishali') were transplanted in greenhouse and open field conditions. Regular irrigation, fertilization, stacking and crop protection measures were adopted as per the package of organic cultivation practices. Observations on height, number of leaves, number of nodes and number of branches were collected in the randomly selected plants. The fruit yield of tomato in greenhouse was compared with that in open field conditions and correlated with other data.

Results and Discussion

It was observed that the vegetative growth of tomato in poly-greenhouse was abundant as compared to that in open field conditions.

Table 1 shows growth in respect of height over weeks. The height in poly-greenhouse reached up to 84.1cm after 10 weeks of transplanting, whereas height of crop in open field was only 69.03cm. This might be due to favorable microclimatic conditions prevailed in poly-greenhouses. Kale *et al.* (1997) reported that the vegetative growth of the cucumber crop in greenhouse was magically high as compared to that in open field conditions. He further observed that the fruit yield was 40 times more in poly-greenhouse as compared to open field conditions.

It was also noted that there were as much as 353.33 leaves per plant grown in poly-greenhouses, whereas 241.57 leaves per plant in open field conditions after 10 weeks of planting.

Regarding the number of branches and number of nodes per plant in poly greenhouses they were higher (114.20 and 19.37) than that of open field. Picking of fruits started from after 9 weeks of transplanting in the poly greenhouse, while in the control plot first yield was collected on 9½ weeks after. This delay of 5 days was due to slow rate of growth and the incidence of disease in the outside crop. A total of 9 pickings were made from poly-greenhouse (Table 2) and open field conditions where there was a difference of 2165 g fruits between the two.

From observations on biometric characters, it was found that the fresh weight of single plant from poly-greenhouse was (988.33 g) 2 times higher as compared to that in open field conditions (491.67 g). The average fruit weight from poly-greenhouse was 95.02 gms and average fruit diameter was 6.23 cm, whereas the average fruit weight was 84.40 gms and average fruit diameter was 5.71 cm from control plot.

The fruit yield (Table 2) from poly - greenhouse was 2985.97 per plant and that from open field was 819.94gms per plant. Therefore, the fruit yield from poly-greenhouse was 3½ times higher as compared to open field conditions.

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Effect of sowing time and intercropping on the yield of coriander under rainfed vertisol condition

N. CHELLAIAH, U. SOLAIAPPAN AND S. SENTHILVEL

Regional Research Station, Aruppukottai - 626 107, Tamil Nadu.

Abstract: Field experiments were conducted during rabi 1997-98 and 1999- 2000 at Regional Research Station Aruppukottai to find out the optimum time of sowing and suitable intercrops for coriander under rainfed vertisol condition. November first week was found to be the optimum time for the sowing of coriander sole crop where as October last week was for coriander intercropping system. Among the intercrops tested, onion was found suitable for intercropping with coriander under rainfed vertisol condition. November first week sown coriander sole crop had recorded higher yields, 143 and 103 kg/ba during 1997-98 and 1999-2000 respectively. During 1999-2000, October last week sown intercropping system had produced more coriander yield equivalent (498 kg ha⁻¹), higher gross income (Rs.7969/ha⁻¹) and net income (Rs.4837/ha⁻¹) with 2.31 and 1.109 as benefit- cost ratio and LER values. Among the intercropping systems followed, during 1999-2000, coriander + onion intercropping system in 1:1 ratio had recorded significantly the highest equivalent yield (871 kg ha⁻¹), more gross income (Rs.11939/ha⁻¹) and net income (Rs.9439/ha⁻¹) with a benefit cost ratio of 3.10. (*Key words: Coriander, Onion, Bengalgram, Karunganni cotton, Time of sowing, Intercropping, Coriander Equivalent Yield.*)

Coriander, one the main spices crop in the vertisols of Southern Zone, is being cultivated during rabi in more than 18,350 hectares with annual production of 5,300 tonnes. The lower productivity in coriander is due to several constraints.

Raising of coriander crop purely under rainfed situation is considered to be one of the constraints in coriander cultivation resulting reduction in yield to the tune of 30 to 75 per cent depending upon the quantum and distribution of North East