Available online at www.ijpab.com

ISSN: 2320 – 7051
Int. J. Pure App. Biosci. SPI: **6 (3):** 676-680 (2018)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Effect of Different Dates of Transplanting and Mulching on Flowering and Fruiting Behaviour of Tomato (*Lycopersicon esculentum* Mill.)

Saurabh Tomar, A. K. Dubey, Mahendra Chaudhary*, Jagendra Pratap Singh and Ram Jeevan
Department of Horticulture, Chandra Shekhar Azad University of Agriculture & Technology,
Kanpur 208002 (U.P.) India
*Corresponding Author E-mail: chaudhary.csa@gmail.com
Received: 9.08.2018 | Revised: 12.09.2018 | Accepted: 23.09.2018

ABSTRACT

The present study was conducted during two consecutive Rabi seasons of 2016-17 and 2017-18 with aim to find out the effect of transplanting dates and mulching on fruiting behaviour and growth of tomato cv. Azad T-6. The study was consisted four different dates of transplanting (D_1-15th October, D_2-31st October, D_3-15th November and D_4-30th November) and four treatments of mulch (M_1-Black polyethylene, M_2- White polyethylene, M_3- Bio Mulch (Paddy straw) and M_4-control) the experiments were laid out in Factorial Randomized Block Design. The study revealed that the crop transplanted on 30th October produces maximum number of flowers/inflorescence and number of inflorescence per plant. However, minimum number of flowers per inflorescence and inflorescence per plant recorded when crop planted on 30th November. Crop grown with bio-mulch produces maximum number of flowers/inflorescence and number of inflorescence per plant. However, minimum number of flowers per inflorescence and inflorescence per plant recorded without application of mulch. Maximum days to first and last harvest were recorded with application of bio-mulch and minimum days took crop grown without mulch.

Key words: *Tomato, Different dates of planting and Mulching.*

INTRODUCTION

It is one of the most popular and widely cultivated vegetable throughout the world and ranking second in importance after potato in many countries including India. The total area of world in tomato under cultivation is 4.78 m ha and total production is 177.04 m tones with 37.00 tones / ha productivity[3]. In India, total area is 0.77 m ha and production is 18.73 m tones with 19.5 tones / ha productivity[3], which is very low as compared to average productivity at world level.

For the cultivation of tomato the various cultural practices followed, planting time is one of the most important factors that greatly influence its growth and yield. There is a wide range of planting time, which may affect its yield and quality due to varying climatic conditions at different stages of crop.

Cite this article: Tomar, S., Dubey, A.K., Chaudhary, M., Singh, J.P. and Ram Jeevan., Effect of Different Dates of Transplanting and Mulching on Flowering and Fruiting Behaviour of Tomato (*Lycopersicon esculentum* Mill.) , *Int. J. Pure App. Biosci.* SPI: **6(3):** 676-680 (2018).

The variation in planting time also affects the plant vigour and spread, which further affect the yield and quality of fruits. If planting time coincides with optimum ecological conditions for better germination, it may lead to better development of plants and ultimately higher yield of good quality fruits. Temperature and light intensity play a vital role in tomato plant growth, fruit set and shape of the fruits. The crop is sensitive to low and high temperature. At transplanting, low temperature leads to poor stand of crop, whereas, high temperature above 35°C affects fruit set and other important quality characteristics.

In North Indian plains and hills, transplanting of seedlings has generally done from November to February. Cold winter and danger of frost are the main hindrances in getting an early spring summer crop. In Haryana, the crop has limited period of growth from December to mid May because higher temperature during the end of May interferes with fruit set due to excessive flower drop. It has become very essential to find out the optimum date of transplanting so that the plants may be exposed to most conducive atmosphere during their growth period for fruit set and higher total yield.

Mulching is a most advantageous practice to conserve the soil moisture, organic matter to the soil where plant wastes used of mulch. Mulching tomato crops has been studied in sub-humid areas with clayey soils in India; in that environment the application of straw mulch increased tomato yields by 30% compared to un-mulched controls[12]. A similar experiment in another sub-humid Indian region with finely textured soils found that rice straw mulch positively affects barley yields. Experiments from other countries in East Africa report similar results; the addition of mulch to shallow tillage systems improves soil conditions and yields of a variety of crops[7,5,8,4]. To ensure the moisture supply mulch should be applied before the end of rainfall. This practice may increase the infiltration of rainwater and suppress the growth of weeds. Planting time also can play a vital role in producing tomato in winter season.

MATERIAL AND METHODS

The treatment combinations, consisting of different dates of transplanting and types of mulches. The study was consisted for four different dates of transplanting (D_1-15th October, D_2-31st October, D_3-15th November and D_4-30th November) and four treatments of mulches (M_1-Black polyethylene, M_2- White polyethylene, M_3- Bio-Mulch (Paddy straw) and M_4-control) the experiments were laid out in Factorial Randomized Block Design.

RESULTS AND DISCUSSION

The data on days to 50% flowering, number of flowers/ inflorescence, number of inflorescence per plant, days to first and last harvesting presented in Table 1.0, 2.0,3.0 and 4.0, respectively indicated that different transplanting dates had significant effect on these traits. It is apparent from the data that there was a gradual decrease in days taken to 50% flowering, the crop transplanted before 30th October took significantly more number of days to 50% flowering.

The phonological parameters as days to attained 50 % flowering, number of flowers per inflorescence, inflorescence per plant, days to first and last harvest significantly influenced due to application of different organic and inorganic mulch during both the years.

The data on days to 50% flowering, number of flowers/ inflorescence, number of inflorescence per plant, days to first and last harvesting presented in Table 1.0, 2.0,3.0 and 4.0, respectively indicated that different transplanting dates had significant effect on these traits. It is apparent from the data that there was a gradual decrease in days taken to 50% flowering, the crop grown with bio mulch took significantly more number of days to 50% flowering followed by black polythene as compared to control.

Table 1: Days to 50% flowering

S. No.	Treatment	Days to 50% flowering	
Factor A	**Date of Transplanting**	**2016-17**	**2017-18**
D_1	15 October	48.20	49.48
D_2	30 October	56.90	58.41
D_3	15 November	52.80	54.18
D_4	30 November	45.05	46.24
	SE (d)	**0.66**	**0.89**
	CD (P = 0.05)	**1.36**	**1.82**
Factor B	**Mulches**		
M_1	Black Polyethylene	51.85	53.02
M_2	White Polyethylene	49.61	50.93
M_3	Bio Mulch (Paddy straw)	54.97	56.43
M_4	Control (No Mulching)	46.51	47.75
	SE (d)	**0.66**	**0.89**
	CD (P = 0.05)	**1.36**	**1.82**

Table 2: Number of flower/ Inflorescence

S. No.	Treatment	Number of flower/ Inflorescence	
Factor A	**Date of Transplanting**	**2016-17**	**2017-18**
D_1	15 October	3.80	3.90
D_2	30 October	4.48	4.60
D_3	15 November	4.16	4.27
D_4	30 November	3.55	3.65
	SE (d)	**0.15**	**0.17**
	CD (P = 0.05)	**0.31**	**0.35**
Factor B	**Mulches**		
M_1	Black Polyethylene	4.09	4.20
M_2	White Polyethylene	3.91	4.02
M_3	Bio Mulch (Paddy straw)	4.33	4.45
M_4	Control (No Mulching)	3.66	3.76
	SE (d)	**0.15**	**0.17**
	CD (P = 0.05)	**0.31**	**0.35**

Crop transplanted on 30th October produced maximum number of flowers/inflorescence and number of inflorescence per plant. However, minimum number of flowers per inflorescence and inflorescence per plant recorded when crop planted on 30 November. Maximum days to first and last harvest was recorded when crop planted on 30 October and minimum days took by 30th November planted crop. It might be due to a marked influence of day and night temperature on the initiation of flowering, fruit set and early fruiting. A gradual increase in temperature coupled with short growth period resulted in early flowering in plant, fruit set and first harvesting, which ware the major components for the enhanced number of fruits. The results of present study are supported by the findings of Samnotra *et al*., Peyvast[11], Singh *et al*.[13], Ahammad *et al*.[2], Abdalbagi *et al*.[1], and Hossain *et al*.[9].

Table 3: Number of Inflorescence/ plant

S. No.	Treatment	Number of Inflorescence/ plant	
Factor A	**Date of Transplanting**	**2016-17**	**2017-18**
D_1	15 October	17.28	17.72
D_2	30 October	20.38	20.91
D_3	15 November	18.91	19.41
D_4	30 November	16.13	16.57
	SE (d)	**0.52**	**0.60**
	CD (P = 0.05)	**1.07**	**1.22**
Factor B	**Mulches**		
M_1	Black Polyethylene	18.59	19.06
M_2	White Polyethylene	17.77	18.24
M_3	Bio Mulch (Paddy straw)	19.68	20.21
M_4	Control (No Mulching)	16.66	17.10
	SE (d)	**0.52**	**0.60**
	CD (P = 0.05)	**1.07**	**1.22**

Table 4: Days to first and last harvesting

S. No.	Treatment	Days to first and last harvesting			
		First harvesting		**Last harvesting**	
Factor A	**Date of Transplanting**	**2016-17**	**2017-18**	**2016-17**	**2017-18**
D_1	15 October	58.94	60.50	115.55	117.22
D_2	30 October	69.54	71.37	122.41	123.83
D_3	15 November	64.54	66.26	120.36	121.90
D_4	30 November	55.07	56.53	114.62	115.97
	SE (d)	**0.68**	**0.96**	**1.48**	**1.75**
	CD (P = 0.05)	**1.40**	**1.96**	**3.02**	**3.57**
Factor B	**Mulches**				
M_1	Black Polyethylene	63.37	65.07	119.87	121.41
M_2	White Polyethylene	60.64	62.23	116.43	118.15
M_3	Bio Mulch (Paddy straw)	67.22	68.99	121.73	123.00
M_4	Control (No Mulching)	56.86	58.37	114.90	116.36
	SE (d)	**0.68**	**0.96**	**1.48**	**1.75**
	CD (P = 0.05)	**1.40**	**1.96**	**3.02**	**3.57**

Crop grown with bio-mulch produces maximum number of flowers/inflorescence and number of inflorescence per plant. However, minimum number of flower per inflorescence and inflorescence per plant recorded without application of mulch. Maximum days to first and last harvest were recorded with application of bio-mulch and minimum days took crop grown without mulch. Maximum harvest duration, number of flowers per inflorescence and flowers per inflorescence in bio mulch might be attributed to suppression of weed growth, reduced fertilizers loss due to leaching and increased mineral nutrient uptake through improved root temperatures. This resulted in increased availability of nutrients for long time. Similar results were reported by Singh *et al.*[13], and Dzomeku *et al.*[6], in tomato.

CONCLUSION

Finally it may be concluded from the present investigation the crop transplanted on 30th October significantly influences the days to 50 % flowering, number of flowers per inflorescence, inflorescence per plant and days taken to first and last harvest during both the years of experimentation. Among mulch

treatments, application of bio-mulch (M_3) produces significantly maximum days to 50 % flowering, number of flowers per inflorescence, inflorescence per plant and days taken to first and last harvest

REFERENCES

1. Abdalbagi, A.H., Salih, O.S., Abdu, E.A. and Ahmed, M.E., Effect of sowing date and plant density on growth and yield of tomato (*Solanum lycopersicum* Mill.). *Research Journal of Agriculture and Biological Sciences*, **6(5):** 665-669 (2010).
2. Ahammad, K.U., Siddiky, M.A., Ali, Z. and Ahmed, R., Effect of planting time on the growth and yield of tomato varieties in late season. *Progressive Agriculture*, **20(1&2):** 73-78 (2009).
3. Anonymous., Statewise Area and Production of Vegetable for the year 2016-17. *Indian Horticulture Database-2014*. National Horticulture Board, Gurgaon, Haryana. pp: 283 (2016).
4. Baijukya, F. P., de Ridder, N. and Giller, K. E., 'Nitrogen Release from Decomposing Residues of Leguminous Cover Crops and their Effect on Maize Yield on Depleted Soils of Bukoba District, Tanzania', Plant and Soil, **279(1):** pp. 77-93 (2006).
5. Biamah, E. K., Gichuki, F. N. and Kaumbutho, P. G., 'Tillage methods and soil and water conservation in eastern Africa', Soil and Tillage Research, **27(1–4):** pp. 105-123 (1993).
6. Dzomeku, I.K., Mahunu, G.K., Bayorbor, T.B. and Obeng-Danso, P., Effects of mulching on weed control and yield of hot pepper and tomato in the Guinea Savannah zone. *Ghana Journal of Horticulture*, **7:** 53-61 (2009).
7. Gicheru, P., Gachene, C., Mbuvi, J. and Mare, E., 'Effects of soil management practices and tillage systems on surface soil water conservation and crust formation on a sandy loam in semi-arid Kenya', Soil and Tillage Research, **75(2):** pp. 173-184 (2004).
8. Gicheru, P. T., 'Effects of residue mulch and tillage on soil moisture conservation', Soil Technology, **7(3):** pp. 209-220 (1994).
9. Hossain, M.F., Ara, N., Uddin, M.S., Islam, M.R. and Kaisar, M.O., Effect of sowing dates on fruit setting and yield of tomato genotypes. *Journal of Agricultural Research*, **52(4):** 547-553 (2014).
10. Kadam, D., Deore, B. and Chaudhari, S., Effects of sowing date and staking on yield of tomato (*Lycopersicon esculentum* Miller). *Indian Agriculturist*, **33:** 225-230 (1991).
11. Peyvast, G.H., Study of some quality and quantity factors of tomato. *Journal of Vegetable Crop Production*, **10:** 15-22 (2001).
12. Shrivastava, P., Parikh, M., Sawani, N. and Raman, S., 'Effect of drip irrigation and mulching on tomato yield', Agricultural Water Management, **25(2):** pp. 179-184 (1994).
13. Singh, B., Kumar, M. and Singh, G.C., Effects of different plastic mulches on growth and yield of winter tomato. *Indian Journal of Horticulture*, **62(2):** 200-202 (2005).