

## Effect of Mulching on Growth, Yield, Pest and Disease Incidence in Summer Tomato

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**Abstract:** The effect of mulching on growth, yield, pest and disease incidence was studied in the summer season at Tomato Improvement Scheme, Department of Horticulture MPKV Rahuri. Significant differences in respect to growth, yield, pest and disease incidence as well as average weight of fruit average, height of plant, no. of branches, no. of fruits per plant, yield per plant and yield per hectare were observed. The treatment T<sub>1</sub> (Black and silver polythene) recorded significantly maximum height of plant (134.06cm) number of branches (6.66), average fruit weight (92.33g), number of fruit per plant (24.32), yield per plant (2.12kg) and yield per hectare, (73.62t/ha). The minimum incidence of average number of white fly per leaves at 60 DAT (3.80) average number of thrips per leaves at 60DAT (2.77) and minimum disease incidence of leaf curl (3.32%) and spotted wilt (2.00%) were observed in treatment T<sub>1</sub> (Black and silver polythene).

**Keywords:** Polythene mulching, DAT, Tomato, Organic mulch, disease and pest.

### INTRODUCTION

Tomato in one of the most popular and warm season vegetable crops grown in the world. The quality production of tomato depends on nutrition and water management, plant protection *etc.* However water management plays an important role for better quality and production. Use of mulches is one of the alternative to retain moisture in soil. A mulch is something, organic or inorganic, that spread on the soil to prevent erosion, retain moisture, prevent weeds from sprouting and keep the root of plants cool.

A good mulch increases the production, decreases the incidence of pest and disease infestation and decreases time spent watering and weeding. Tomatoes grown with plastic mulches produces fruits earliest and more fruits throughout the season than other mulches. It keeps soil warmer in winter and cooler in summer. Therefore the present investigation was conducted to study the effect of mulching on growth, yield pest and disease incidence in summer tomato.

### MATERIALS AND METHODS

The experiment was conducted at Tomato Improvement Scheme, Department of Horticulture MPKV Rahuri in summer season. The experiment was layout in Randomized Block Design with three replications and seven treatments. The treatment includes black and silver polyethylene (T<sub>1</sub>), black and white polyethylene (T<sub>2</sub>), black and red polyethylene (T<sub>3</sub>), black and yellow polyethylene (T<sub>4</sub>) weed mat (T<sub>5</sub>) wheat straw as organic mulch (T<sub>6</sub>) and control without mulch (T<sub>7</sub>). The 20 to 25 days old seedling were transplanted on raised beds (0.9m by 11.25m) with 0.60 m row to row, 1.20 m spacing between pairs and 0.45 m plant to plant spacing. The farm yard manure (20t/ha) was applied in the bed at the time of preparation of raised bed. The water soluble fertilizer (300 : 150 : 150 kg NPK ha) were given through drip at weekly interval in 14 equal weekly splits. The raised beds are covered with polythene paper (mulch) as/ per the treatments (for treatment T<sub>1</sub> to T<sub>4</sub>) and remaining as the treatments mentioned. The observations regarding growth, yield and pest and disease incidence were recorded.

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**Table 1**  
Effect of mulching on growth and yield in Tomato

Treatment	Plant height (cm)	No. of Branches	Av. fruit weight (g)	No. of Fruit/Plant	Yield/plant (kg.)	Yield/plot (kg.)	Yield/ha. (t)
T <sub>1</sub>	134.06	6.66	92.33	24.34	2.12	74.55	73.63
T <sub>2</sub>	120.14	5.47	80.40	24.37	1.88	65.05	64.25
T <sub>3</sub>	125.57	5.53	86.00	25.08	1.94	67.63	66.79
T <sub>4</sub>	128.43	5.61	89.67	22.08	2.08	69.49	68.63
T <sub>5</sub>	115.37	4.81	84.74	20.89	1.75	63.86	63.07
T <sub>6</sub>	110.49	4.54	79.16	17.88	1.64	62.83	62.54
T <sub>7</sub>	106.08	4.22	76.80	16.22	1.56	61.02	60.27
S.E	2.88	0.35	2.39	1928	0.11	0.27	2.67
C.D. at 5%	8.49	1.03	7.05	5.943	0.31	0.81	7.98

**Table 2**  
Effect of mulching on pest and disease incidence Tomato

Treatment	Average of white fly/ leaf		Average of no. of Thrips/ leaf		Percent disease incidence	
	45DAT	60DAT	45DAT	60DAT	Leaf curlvirus	Spottedwilt virus
T <sub>1</sub>	0.80(5.13)	3.40(10.63)	2.26(8.72)	2.77(9.46)	3.32(10.49)	2.00(8.13)
T <sub>2</sub>	1.06(5.74)	3.80(11.24)	2.13(10.14)	2.80(9.63)	4.00(11.53)	2.66(9.38)
T <sub>3</sub>	1.13(6.02)	3.96(11.39)	2.63(9.28)	4.67(12.38)	5.33(13.34)	2.66(9.38)
T <sub>4</sub>	0.90(5.44)	4.26(11.83)	2.82(9.64)	4.40(12.11)	4.66(12.46)	3.00(9.97)
T <sub>5</sub>	4.60(12.38)	6.20(14.43)	2.86(9.63)	4.93(12.79)	6.00(14.17)	4.00(11.53)
T <sub>6</sub>	5.06(12.92)	6.43(14.65)	5.53(13.31)	5.26(13.18)	8.00(16.43)	4.66(12.46)
T <sub>7</sub>	4.80(12.66)	7.20(12.56)	5.40(13.44)	7.40(15.79)	12.66(20.84)	5.56(13.76)
SE	0.41	0.46	0.54	0.48	0.46	0.41
CD@ 5%	1.28	1.43	1.65	1.39	1.43	1.27

## RESULT AND DISCUSSION

The significant difference in respect of growth, yield/ (Table 1) and pest and disease incidence (Table 2) were observed.

### GROWTH

It is revealed that the maximum plant height (134.06 cm) was observed in treatment T<sub>1</sub> i.e black and silver polythene and minimum plant height in treatment T<sub>7</sub> i.e control (without mulch) The same findings were observed by Jan *et al.* (2002), Singh *et al.* (2005), Aruna *et al.* (2007) and Singh and Kumar (2007).

As regards to number of branches, maximum number of branches per plant (6.66) were observed in treatment T<sub>1</sub> i.e black and silver polyethylene and minimum no of branches. (4.22) in treatment T<sub>7</sub> i.e control (without mulch) Singh *et al.* (2005, 2006) also observed the same results.

### YIELD

It is revealed that maximum weight of fruit (92.33 g) was observed in treatment T<sub>1</sub> (black and silver polythene) where as minimum weight and fruit (76.08 g) was observed in T<sub>7</sub> i.e control (without mulch). Hooda *et al.* (1999) and Aruna *et al.* (2007).

This study revealed that maximum yield/ha was observed in treatment T<sub>1</sub>(73.62t/ha) i.e black and silver polyethylene whereas minimum yield (60.26t/ ha) was recorded in treatment T<sub>7</sub> i.e control (without mulch).

The increase in yield by using polyethylene (mulch) is due to moisture regulation by inhibiting evaporation, improvement in plant health and fruiting *etc.* In previous studies number of workers recorded the same results *viz.*, Hooda *et al.* (1999), Hanna (2000), Jan *et al.* (2002), S ingh *et al.*( 2005), Singh *et al.* (2006), Singh and Kumar (2006) Rashid *et al.* (2009) have also observed the same results.

## PEST AND DISEASE INCIDENCE

It is revealed that, the minimum incidence of average no of white flies per leaves at 60 DAT (3.40), average no of thrips per leaves (2.77) minimum per cent disease incidence of leaf curl (3.32%) and spotted wilt (2.00%) were observed in T<sub>1</sub> (black and silver polyethylene). Hooda *et al.* (1999), Diaz *et al.* (2003) Diaz-Perez *et al.* (2007), Shehzad and Kumar (2004) and Handal *et al.* (2006) recorded the same results.

## References

- Aruna, P.I.P. Sudagar, M.I. Manivannan, J. Rajangam and S. Natarajan (2007), Effect of fertigation and mulching for yield and quality in tomato cv. PKM-1 Asian J. of Horti. 2(2): 50-54.
- Diaz-Perez, J.C. and K.D. Batal (2002), Coloured plastic film mulches affect tomato growth and yield via changes in root zone temperature. J. American Soc Hort. Sci. 127: 127-136.
- Diaz-Perez, J.C., R. Gitaitis and B. Mandal (2007) Effects of plastic mulches on root zone temperature and on the manifestation of tomato spotted wilt symptoms and yield of tomato. Sci. Hort. 114 (2): 90-95.
- Diaz-Perez, K. Juan, D. Batal, D. Granberry, D. Bertand and D. Giddlings (2003), Growth and yield of tomato on plastic film mulches as affected by tomato spotted wilt virus. Hort. Sci. 38(3): 359-399.
- Hanna, H.Y. (2000), Double cropping in muskmetion with nematode resistant tomatoes increases yield, but mulch colour has no effect. Hort. Sci. 35(7): 1213-1214.
- Hooda, R.S., J. Singh, Y.S. Malik and V.K. Batra (1999), Influence of direct seeding, transplanting time and mulching on tomato yield. Veg. Sci. 26(2): 140-142.
- Jan, U., M. Ishtiaq, M. Sher, N. Nissar and N. Muhammad (2002), Effect of different mulching materials and irrigation intervals on the growth, yield and quality of tomato cv. Peshawar local (Roma). Sarhad J. Agric. 18(2): 167-171.
- Rashidi M., A. Saeed and M. Gholami (2007), Interactive effects of plastic mulch and tillage method on yield and yield components of tomato. American-Eurasian J. Agric. And Environ. Sci. 5(3): 420-427.
- Shehnaz E. and K. Kumar (2004), Effect of leaf curl disease on yield of tomato. Prog. Horti. 36(1) : 155-156.
- Singh B. and M. Kumar, G.C. Singh (2005), Effect of different plastic mulches on growth and yield of winter tomato. Indian J. Hort. 62.(2): 200-202.
- Singh R.R. and S. Kumar (2007), Effect of drip irrigation and black polythene mulch on growth, yield, efficiency and economic of tomato. Veg. Sci. 34(2): 177-180.
- Singh R.R. Asrey and S. Kumar (2005) Effect of transplanting time and mulching on growth and yield of tomato. Indian J. Hort. 62(4) : 350-353.
- Singh, V.P., R.P. Singh, S.K. Arora, A.K. Godara and B.S. Yadav (2006), Effect of black polythene mulch on growth and fruit yield of tomato. Haryana. J. Hort. Sci. 35(3/4): 323.