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### Effect of mulching on growth, yield and weed management in rose

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**Abstract**

A field experiment was carried out to access the effect of mulching on growth, yield and weed management in rose cv. Gladiator. The experiment was conducted at AICRP on Floriculture, NARP, Pune during the year 2011-12 to 2013-14 with eight different black and white polyethylene mulch of various thickness, paddy straw and without mulch treatments. The experiment was laid out in Randomized Block Design with three replications. The pooled data result revealed that the plant covered with 300  $\mu$  thick black polyethylene mulch was at par with 400  $\mu$  thick black polyethylene mulch in respect of number of flowers per plant (38.03 and 36.07, respectively), flower diameter (6.36cm and 6.43cm, respectively), flower length (4.66cm and 4.42cm, respectively) and flower stem length (52.86cm and 52.53cm, respectively). However, black polyethylene mulch showed better results of growth, yield and weed management as compared to white polyethylene mulch and paddy straw.

**Keywords:** Black polyethylene mulch, white polyethylene mulch, yield, vase life

**Introduction**

Rose is one of the leading cut flower crops in the world flower trade. It adapted to various climatic conditions. Rose cv. Gladiator is very popular for open field cultivation of Hybrid Tea group. Favorable climatic conditions play important role in growth and production of flowering plant. However, not only ideal environmental conditions but also soil plays a very important role in crop production. Soil health includes several component, among them soil moisture, soil temperature and presence of micro flora and fauna are important.

Among different methods of soil moisture and temperature regulation, mulching is one of the best, easy and cost effective methods. Mulching is a cultural practice aimed to conserve soil moisture <sup>[1]</sup>, regulate soil temperature <sup>[2]</sup>, control weed growth <sup>[3]</sup>, reduce soil erosion and reduce the impact of falling raindrops <sup>[4]</sup>. It also increase the nutrient availability and ensure better yield and higher quality fruit <sup>[5]</sup>. Commonly polyethylene sheet, straw, dried leaves, sugar trash, bagasses, paper, wood chips, saw dust, rice husk, stone/ pebbles etc. are used for mulch. Beneficial effects of mulching on growth, yield, quality and weed control have been noticed in fruit crops. However, literature on the use of mulches in flowers is meagre hence the present study was undertaken.

**Material and methods**

The experiment was conducted at All India Co- ordinate Research Project on Floriculture, NARP, Ganeshkhind, Pune on rose cv. Gladiator. Six months old healthy budded plants were planted in the field during second week of July, 2011. Plants were planted in each plot at 60 X 45 cm distance after spreading the mulching material on soil. The experiment was laid out in Randomized Block Design, comprising eight treatments replicated thrice. The treatments comparing of mulching material are T1- Black polyethylene- 200 micron thick, T2- Black polyethylene- 300 micron thick, T3- Black polyethylene- 400 micron thick, T4- White polyethylene- 200 micron thick, T5- White polyethylene- 300 micron thick, T6- White polyethylene- 400 micron thick, T7- Paddy straw @ 6 tonnes per hectare and T8- Control (without mulch). Observation was recorded on weed intensity, growth and yield parameters of rose. The data was recorded for three years during 2011-12 to 2013-14 and pulled results are presented.

**Result and Discussion**

The vegetative growth of rose cv. Gladiator was significantly influenced by mulching material. The pooled data presented in Table 1 showed the maximum plant height (87.00cm) with 400  $\mu$

Black polyethylene mulch. Whereas minimum plant height (72.27cm) was reported in plants mulched with paddy straw. Significantly maximum North- south plant spread (38.07cm) was recorded in plants grown under 300  $\mu$  Black polyethylene in mulch. The branches per plant noticed more (4.19) in 300 $\mu$  Black polyethylene and was at par with 400  $\mu$  White polyethylene mulch (4.17) and 400 $\mu$  Black polyethylene mulch (4.04). However, non-significant effects of different mulching treatments were observed for East-West plant spread of rose. In general, growth parameters of rose recorded

best under black polyethylene mulch. Black colour polythene has more capacity to regulate soil temperature than other mulch material. It might have provided suitable condition of plant in respect to height, number of branches and spread of plant by improving microclimate condition of soil and availability of nutrient to the plant. Similar observations of increasing plant height and number of branches with black polyethylene mulch have also been reported earlier in garlic [6], in strawberry [7] and in tomato [8].

**Table 1:** Effect of Mulching on growth of Rose var. Gladiator

Treatments	Plant height(cm)				Plant spread (ExW) cm				Plant spread (NxS) cm				No. of branches /plant				Days to flowering			
	11-12	12-13	13-14	pooled	11-12	12-13	13-14	pooled	11-12	12-13	13-14	pooled	11-12	12-13	13-14	pooled	11-12	12-13	13-14	pooled
T <sub>1</sub>	80.50	82.60	81.80	81.63	25.60	27.50	28.40	27.17	30.60	32.40	34.70	32.57	3.30	3.60	3.80	3.57	180.40	175.60	171.80	175.93
T <sub>2</sub>	82.60	84.50	85.50	84.20	30.50	32.60	30.70	31.27	36.00	38.70	39.50	38.07	4.00	4.53	4.03	4.19	183.60	178.40	180.50	180.83
T <sub>3</sub>	85.80	86.40	88.80	87.00	27.80	29.70	27.50	28.33	32.70	34.60	36.40	34.57	3.50	4.13	4.50	4.04	185.67	180.70	185.93	184.10
T <sub>4</sub>	81.70	80.67	82.60	81.66	24.30	29.83	30.60	28.24	29.80	31.90	32.50	31.40	3.00	3.53	3.90	3.48	185.07	179.93	175.80	180.27
T <sub>5</sub>	84.30	83.40	84.80	84.17	26.40	28.80	26.53	27.24	30.20	32.40	31.53	31.38	3.47	3.77	3.00	3.41	186.47	181.70	176.60	181.59
T <sub>6</sub>	83.80	80.50	82.70	82.33	24.80	26.80	24.70	25.43	31.00	33.70	32.70	32.47	4.00	4.50	4.00	4.17	191.00	186.00	180.50	185.83
T <sub>7</sub>	70.40	74.80	71.60	72.27	28.30	30.00	27.83	28.71	30.50	32.60	31.30	31.47	3.70	3.27	3.40	3.46	187.60	182.40	179.50	183.17
T <sub>8</sub>	75.90	78.90	80.90	78.57	22.70	50.40	28.40	33.83	27.80	29.40	30.03	29.08	3.00	3.50	3.00	3.17	192.60	187.60	185.27	188.49
S E+ <sub>-</sub>	1.19	0.21	1.24	0.87	0.61	1.20	1.25	2.83	1.29	0.26	1.08	0.43	0.43	0.26	0.29	0.19	1.12	0.49	4.35	1.25
CD at 5%	3.63	0.65	3.85	2.65	1.80	3.66	NS	NS	3.95	0.81	3.30	1.32	NS	0.80	0.90	0.57	3.42	1.49	NS	3.83

Significantly early flowering (175.93 days) was found in 200 $\mu$  black polythene mulch and it delayed by control treatment (188.49 days). However, 300 $\mu$  and 400 $\mu$  thick black polythene mulch and 200  $\mu$  and 300  $\mu$  white polythene mulch failed to influence any significant effect on days to flowering (Table 2). Significantly early flowering with black polyethylene mulch then white polythene have been reported in strawberry [9] and [8] in tomato. Maximum number of flower per plant (38.03), flower length (4.66cm) and flower stem length (52.86cm) were recorded with 300 micron black polythene mulch treatment which was very closely to 400 micron black polyethylene in result. However, flower diameter (6.43cm) was found maximum in 400 micron black polyethylene mulch treatment which was at par with 300

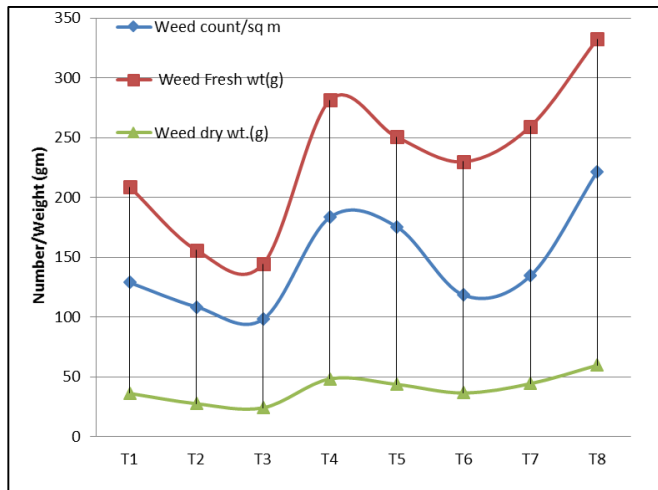
micron black polyethylene mulch (6.36cm)(Table 2). Similarly, [10] reported highest number of flower per plant in aster under black plastic mulch then straw mulch. The maximum flower stalk length and flower diameter in plant underneath the black polyethylene mulch was noticed [11] in rose. This might be due to the fact that black polyethylene mulch improves the soil physical, biological and chemical condition for better crop performance. It also plays an important role in nutrient uptake as they provide favorable environment for better root growth by increasing the soil temperature and conserving suitable soil moisture regime. The vase life of flowers in tap water at ambient temperature was not established significant effect on different treatment of mulching

**Table 2:** Effect of Mulching on yield of Rose var. Gladiator

Treatments	No of flower/plant				Flower dia. (cm)				Flower length (cm)				Flower stem length (cm)				Vase life (days)			
	11-12	12-13	13-14	pooled	11-12	12-13	13-14	pooled	11-12	12-13	13-14	pooled	11-12	12-13	13-14	pooled	11-12	12-13	13-14	pooled
T <sub>1</sub>	34.60	32.70	30.60	32.63	6.50	5.40	5.90	5.93	3.80	3.60	3.26	3.55	40.8	42.5	42.13	41.81	7.00	6.00	5.00	6.00
T <sub>2</sub>	40.80	38.50	34.80	38.03	6.90	6.00	6.17	6.36	4.50	4.70	4.77	4.66	50.6	54.7	53.27	52.86	6.50	6.50	5.00	6.00
T <sub>3</sub>	36.90	34.80	36.50	36.07	6.70	5.80	6.80	6.43	4.40	4.00	4.86	4.42	49.6	51.4	56.6	52.53	6.00	5.50	6.50	6.00
T <sub>4</sub>	33.50	30.40	31.40	31.77	5.40	5.50	5.80	5.57	3.50	3.80	3.40	3.57	43.5	45.8	49.7	46.33	5.47	5.00	5.40	5.29
T <sub>5</sub>	35.70	32.50	30.80	33.00	6.00	5.00	6.00	5.67	3.90	3.50	2.26	3.22	50.07	52.6	50.6	51.09	6.00	6.50	6.00	6.17
T <sub>6</sub>	38.00	35.80	33.00	35.60	6.70	6.00	5.60	6.10	4.30	4.40	4.01	4.24	44.7	48.5	52.3	48.5	5.60	5.80	5.30	5.57
T <sub>7</sub>	31.80	30.40	32.40	31.53	5.80	5.40	5.30	5.50	3.50	3.70	3.30	3.50	38.47	40.6	43.6	40.89	5.00	5.40	5.40	5.27
T <sub>8</sub>	30.40	29.80	27.80	29.33	5.00	5.30	5.70	5.33	3.00	3.50	3.00	3.17	38.6	39.9	40.5	39.67	5.33	5.00	5.00	5.11
S E+ <sub>-</sub>	1.43	0.29	1.60	0.78	0.43	0.09	0.15	0.22	0.35	0.09	0.11	0.22	2.04	0.35	0.97	0.95	0.87	0.11	0.48	0.31
CD at 5%	4.47	0.88	4.91	2.39	NS	0.26	0.46	0.68	NS	0.29	0.33	0.67	6.25	1.07	2.91	2.89	NS	0.33	NS	NS

It is depicted from Fig. 1 that the weed biomass influences significantly under different mulching treatment. The fresh and dry weight of weed was less in black polyethylene then white polyethylene mulch irrespective of different thickness. This might be due to black colour of the polyethylene absorbed all the incident radiations itself. Therefore, less light

penetration occurred through the black polyethylene mulch which ultimately check the weed seed germination and growth. Similarly, [12] reported that the highest and lowest weed biomass in white and black plastic mulches, respectively. The black polyethylene mulches resulted in 80% reduction in weed biomass have been reported in tomato [8].



**Fig 1:** Effect of Mulching on Weed count and Weight

### Conclusion

It is concluded that the black polyethylene mulch noticed better result of rose growth and yield than white polyethylene mulch, paddy straw and control treatments. It also checks the weed growth and reduced the total weed biomass in rose field under open condition.

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