



## Impact of different mulch materials on growth and flowering of rose cv. *Mainu Parle*

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### ABSTRACT

The experiment was carried out in AICRP on Floriculture at Chiplima, Odisha for 3 consecutive years from 2011-12 to 2013-14. One year budded plants of cultivar 'Mainu Parle' were planted in beds of 2 x 1.8 m at spacing of 60 x 45 cm, following randomized block design in three replications. Black and white polythene mulches of 200, 300 and 400 micron each and paddy straw mulch was taken as various treatments with a control, where no mulching was applied and the weeds were allowed to grow as such. Observations were recorded for three consecutive years and pooled data was calculated. Maximum weed count (8.7/m<sup>2</sup>) was observed under transparent polythene mulch of 400 micron thickness where as no weeds grew under black polythene mulch irrespective of its thickness. Similarly in case of weed fresh weight (196.37 g) and weed dry weight (30.39g) were maximum in the plots treated with transparent polythene mulch of 400 micron thickness. No significant difference was found in number of days to first flowering from planting and branch counts per plant. However, in flowering duration, the plot treated with 300 micron thickness of black polythene mulch showed significant difference both during 2012-13 and 2013-14 (10.73 days). The most important among the yield driving parameter, the number of flowers per plant was studied, it was found that the plants treated with 300 micron black polythene mulch had a distinct edge over the other treatments in the year 2012-13 (27.12 nos.), 2013-14 (30.70 nos.) and also in the pooled data (25 nos.). Suggesting that 300 micron black polythene should be recommended for controlling weed in rose cultivar 'Mainu Parle'.

**Keywords:** Black polythene, mainu parle, mulching, paddy straw, rose

Rose is undoubtedly the world's most favorite flower. Nearly about 90 per cent of India's green houses are covered with rose plants. This highly remunerative crop needs proper care and attention for luxurious growth and lucrative return. So every aspect of the management and cultural practices are equally important while growing the crop. Among them one of the major aspects is weed management. Mulching is the best weed management practice known so far. Apart from its mechanism of weed control, it also bears the properties to improve soil physical, chemical and biological conditions for better crop performances as reported by Al- Rawahy *et al.*, 2011 and Christopher *et al.*, 2011). Nutrient uptake is highly influenced by suitable mulching as increased soil temperature and suitable moisture regime promotes favourable environment for root growth, ultimately proliferating the uptake. Organic mulches also add fertility to soil. However with development of polythene mulches, the weed management and crop production has become cheaper and better to manifold, which adds to the benefit of farmers by lesser input use and higher input use efficiency. This experiment was conducted to investigate the plant growth behaviours under different mulch materials on a popular rose variety "Mainu parle".

### MATERIALS AND METHODS

The present investigation was taken up in AICRP on Floriculture at Chiplima, Odisha for 3 consecutive years

from 2011-12 to 2013-14. One year budded plants of cultivar 'Mainu Parle' a ruling variety of the state were planted in beds of 2 x 1.8 m at spacing of 60 x 45 cm, following randomized block design in three replication. The plants were planted in beds of 2 x 1.8 m at spacing of 60 x 45 cm. 12 plants were planted in one plot. Black and white polythene mulches of 200, 300 and 400 micron each and paddy straw mulch was taken as various treatments leaving no treatment as control. Observations on various growth parameters were recorded for three consecutive years continuously. The following table (Table 1) narrates the treatment details used for this experiment.

**Table 1: Table showing the treatment details**

Treatments	Treatment details
T <sub>1</sub>	Black polythene– 200 micron
T <sub>2</sub>	Black polythene– 300 micron
T <sub>3</sub>	Black polythene – 400 micron
T <sub>4</sub>	White polythene – 200 micron
T <sub>5</sub>	White polythene – 300 micron
T <sub>6</sub>	White polythene –400 micron
T <sub>7</sub>	Paddy straw – 6 t ha <sup>-1</sup>
T <sub>8</sub>	Control (without mulch)

Table 2: Effect of different mulch materials on weed growth and vegetative characteristics of Rose plant cv. “Mainu parle”

Treatments	Treatment details	Weed count m <sup>-2</sup>				Fresh weight (g)				Dry weight (g)				Plant height at 1st flower bud appearance			
		2011-12	2012-13	2013-14	2013-14 pooled	2011-12	2012-13	2013-14	2013-14 pooled	2011-12	2012-13	2013-14	2013-14 pooled	2011-12	2012-13	2013-14	2013-14 pooled
T <sub>1</sub>	Black polythene – 200 micron	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	74.73	72.33	74.53	73.86
T <sub>2</sub>	Black polythene – 300 micron	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	69.4	67.4	68.53	68.44
T <sub>3</sub>	Black polythene – 400 micron	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	67.76	65.78	66.55	66.7
T <sub>4</sub>	White polythene – 200 micron	3.42	4.34	4.44	7.04	14.46	13.89	13.8	110.79	5.69	5.75	5.72	18.23	75.2	73.22	74.34	74.25
T <sub>5</sub>	White polythene – 300 micron	3.45	4.42	4.4	6.83	13.69	12.95	12.98	75.42	5.09	5.12	5.2	12.37	75.94	73.93	74.87	<b>74.91</b>
T <sub>6</sub>	White polythene – 400 micron	3.87	4.73	4.71	<b>8.7</b>	20.32	19.53	19.57	<b>196.37</b>	7.57	7.27	7.32	<b>30.39</b>	73.19	71.9	72.08	72.39
T <sub>7</sub>	Paddy straw – 6 t ha <sup>-1</sup>	1.64	2.63	2.6	2.52	3.83	2.81	2.89	6.9	1.79	1.92	1.9	2.23	64.2	62.23	63.41	63.28
T <sub>8</sub>	Control (without mulch)	3.61	4.53	4.51	7.24	13.49	12.78	12.82	70.09	5.42	5.35	5.39	13.39	70.88	68.85	69.72	69.82
<b>SEm (±)</b>				<b>1.65</b>				<b>63.36</b>				<b>8.27</b>					<b>0.17</b>
<b>LSD(0.05)</b>		<b>1.58</b>	<b>1.58</b>	<b>1.65</b>	<b>5.01*</b>	<b>12.76</b>	<b>12.76</b>	<b>18.23</b>	<b>192.17</b>	<b>4.64</b>	<b>4.64</b>	<b>8.27</b>	<b>25.09</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>

Table 3: Effect of different mulch materials on flowering and yield attributing characteristics of Rose plant cv. “Mainu parle”

Treatments	Treatment details	No of branches plant <sup>-1</sup>				Days to flowering				Duration of flowering				No of flowers plant <sup>-1</sup>			
		2011-12	2012-13	2013-14	2013-14 pooled	2011-12	2012-13	2013-14	2013-14 pooled	2011-12	2012-13	2013-14	2013-14 pooled	2011-12	2012-13	2013-14	2013-14 pooled
T <sub>1</sub>	Black polythene – 200 micron	3.67	6.66	6.66	5.66	51.67	52.67	52.67	52.34	7.33	10.64	10.64	9.54	21.33	24.3	27.89	24.51
T <sub>2</sub>	Black polythene – 300 micron	3	6	6	5	50	51	51	50.67	7.33	<b>10.73*</b>	<b>10.73*</b>	12.44	15	<b>27.12*</b>	<b>30.70*</b>	25
T <sub>3</sub>	Black polythene – 400 micron	3.45	6.54	6	5.33	48.33	49.33	49.33	49	7.67	10.64	10.64	9.65	20	25.2	25.25	23.48
T <sub>4</sub>	White polythene – 200 micron	4.22	7.28	7.33	6.28	49.67	50.67	50.67	50.34	7	9.82	9.82	8.88	24.33	22.43	25.54	24.1
T <sub>5</sub>	White polythene – 300 micron	3.44	6.43	6.33	5.4	50	51	51	50.67	8	10.13	10.13	9.42	19	23.45	24.56	22.34
T <sub>6</sub>	White polythene – 400 micron	3.33	6.32	6	5.22	52.33	53.33	53.33	53	7.33	10.51	10.51	9.45	19.33	23.98	26.52	23.28
T <sub>7</sub>	Paddy straw – 6 t ha <sup>-1</sup>	3.33	6.31	6	5.21	50.33	51.33	51.33	51	7.67	10.48	10.48	9.54	22	23.02	22	22.34
T <sub>8</sub>	Control (without mulch)	3.33	6.3	6.33	5.32	52.67	53.67	53.67	53.34	7.33	10.62	10.62	9.52	18.33	20.14	19.28	19.25
<b>SEm (±)</b>				<b>0.07</b>				<b>1.23</b>					<b>1.22</b>				<b>2.35</b>
<b>LSD(0.05)</b>		<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>2.43</b>	<b>6.4</b>	<b>7.12</b>

Weed count per square meter was recorded. Oven drying method was adopted to collect the fresh weight and dry weight of the weed. Plant height at which first bud appeared was also taken as observation. Different yield attributing parameters of the variety such as number of branches plant<sup>-1</sup>, days to first flowering, flowering duration and number of flowers plant<sup>-1</sup> were also recorded.

## RESULTS AND DISCUSSION

### Impact of different mulching on weed growth and vegetative characteristics

Data presented in table 1 indicate that the weed count m<sup>-2</sup>, fresh weight and dry weight of weeds varied significantly among treatments in all the years along with the pooled data. No weeds grew under black polythene irrespective of its thickness. Profuse weed growth was observed under transparent polythene irrespective of its thickness. In the initial stage of growth, the variation was negligible, but later on it varied significantly among all the treatments. Maximum weed count (8.7/m<sup>2</sup>) was observed under transparent polythene mulch of 400 micron thickness followed by the control plot (7.24/m<sup>2</sup>). It was also statistically at par with the weed count of the transparent mulch of 200 micron thickness mulch. Similarly in case of fresh weight of weed, the plots under 400 micron thickness were found maximum infested (196.37 g), statistically at par with almost all treatments except the plots treated with black polythene mulch of all thickness, which were found weed free. The dry weight of weeds also varied significantly with various treatments and was found maximum in the treatment of transparent polythene mulch of 400 micron thickness (30.39g) followed by the control plot. However, no significant difference was found in the plant height at first flowering though the treatments of transparent polythene mulch of 300 micron thickness (74.91 cm), black polythene mulch of 200 micron thickness (73.86 cm) showed the maximum plant height.

This result corroborates with the detections of Bohra *et al.*, 2015, who stated that black polythene mulch of 200 micron thickness induces better plant growth over other mulches due to minimal weed infestation, maximum moisture conservation and temperature regulation etc. Similar results were also found by Younis *et al.*, 2012, who investigating on freesia plants concluded that vegetative growth and development was triggered by black plastic mulch while both qualitative and quantitative flower production was encouraged by straw mulch.

### Effect of different mulch materials on flowering and yield attributing

The data reflected on table 3 reveals the impact of the mulch treatments on flowering and yield attributing parameters of Rose. Number of branches plant<sup>-1</sup> was though not significant among treatments, found best in 200 micron transparent plastic mulch followed by 200 micron black plastic mulch. Similarly no significant difference was found in days to flowering from planting. However, in duration of flowering, the plot treated with 300 micron thickness of black polythene mulch showed significant difference both during 2012-13 and 2013-14 (10.73 days). But no significant difference was found in the pooled data. Similarly when the most important yield driving parameter, the number of flowers plant<sup>-1</sup> was studied, it was found that the plants treated with 300 micron black polythene mulch had a distinct edge over the other treatments in the year 2012-13 (27.12 nos), 2013-14 (30.70 nos) and also in the pooled data (25 nos).

Though data for various parameters under different mulching was found insignificant, but the best results were found under black plastic mulches of 300 micron thickness. However, in the second and third year of crop growth, flowering duration and flower numbers plant<sup>-1</sup> were seen significantly higher under 300 micron thick black polythene mulch. These two are major yield driving parameters. This result corroborates with Solaiman *et al.*, (2008), who worked on Aster and reported that straw mulch promotes greater plant height black polythene mulch was helpful for early flower initiation. Increase in soil moisture level due to reduced transpiration might be a possible cause for this as reported by Baumhardt and Jones, 2002; Zhang *et al.*, 2009 and Yi *et al.*, 2011. Similarly, Younis *et al.*, 2012 reported that plant growth and development in freesia plant was triggered with black mulch treatment.

The minimum weed infestation and major yield attributing characters like duration of flowering & number of flowers plant<sup>-1</sup> was highest in treatment of black polythene mulch of 300 micron thickness. Thus, Black Polythene 300micron may be used for rose plants to control weed.

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