

# Effect of Different Mulches on Vegetative growth of Strawberry (cv. Tioga) under Red and Lateritic Zone of West Bengal

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**Abstract**—The present investigation was carried out at the Horticulture Farm, Institute of Agriculture, Visva Bharati University, West Bengal (India) during period of November 2013 to April 2014 to study the effect of different mulches on Vegetative growth of strawberry. The experiment was laid out in a Randomized Block Design (RBD) with six treatments ( $T_0$ =no mulch,  $T_1$ =Straw mulch @5 t/ha,  $T_2$ =Transparent polythene mulch,  $T_3$ =Black polythene mulch,  $T_4$ =Glyricidia leaf mulch @5 t/ha,  $T_5$ =News paper mulch @5 t/ha) and three replications. The experimental findings revealed that the highest plant height (27.54cm), canopy diameter (36.06 cm), number of leaves (12.61), leaf breadth (10.14 cm) and chlorophyll content (45.46 mg/100g) were observed under transparent polythene mulch ( $T_2$ ) and lowest results were observed in no mulch ( $T_0$ ) condition. Based on evidence of the experimental findings transparent polythene mulch can be advocated as a best mulch material and black polythene mulch ( $T_3$ ) is a better option for farmers to increase vegetative growth of Straw berry.

**Keywords:** Mulch, Runner production, Straw berry, vegetative growth.

## 1. INTRODUCTION

Strawberry (*Fragaria X ananassa* Duch.) is one of the most important temperate fruit and it is very much liked for its attractive shape, distinct pleasant aroma and refreshing nature. Although it is a major fruit of temperate regions, with the advantage of day-neutral cultivars, it grows profitably well in tropical and sub-tropical regions. However, in recent years, several agro-techniques have been standardised for day-neutral varieties (Rajbir Singh *et al.*, 2005). Hence, strawberry has now become the most favored fruit crop among the growers, especially near towns and cities because of its remunerative prices and higher profitability, which has resulted in a phenomenal increase in its area and production (Sharma and Sharma, 2005). Successful strawberry production depends upon the use of quality of planting materials. High quality virus free planting material leads to the higher yield and good return. According to Gafke *et al.* (1993), using low quality

plants leads to a high loss of yield and is impossible to compensate. Though there are different propagation materials but growing of strawberry plants from a runner is, for most, the easiest and quickest way to propagate strawberries. Production of quality planting material of strawberry through runner depends on some factors like nutritional status of soil, vegetative growth of plants. Good vegetative growth, minimum load of fruit generally leads to the better growth of runners. Strawberry is a low surface creeping herb and, hence, mulching plays a very important role in soil moisture conservation, weed control and regulation of soil-hydrothermal regimes. In addition, mulching also improves vegetative growth of the plant and quality in strawberry (Hassan *et al.*, 2000). Better vegetative growth is important for healthy and vigorous runner production in strawberry where production of quality planting material is a great concern. However there are very few reports on effect of mulches on vegetative growth and runner production of strawberries. Therefore, an investigation was conducted to study the effect of various mulches on vegetative growth of straw berry.

## 2. MATERIALS AND METHODS

The experiment was carried out on Strawberry at the Horticulture Farm, Institute of Agriculture, Visva-Bharati University, West Bengal, India during of November 2013 to April 2014. The experiment was laid out in the randomized block design consisting of six treatments i.e.,  $T_0$ =no mulch,  $T_1$ =Straw mulch @5 t/ha,  $T_2$ =Transparent polythene mulch,  $T_3$ =Black polythene mulch,  $T_4$ =Glyricidia leaf mulch @5 t/ha,  $T_5$ =News paper mulch @5 t/ha treatment with three replications. Four plots each measuring 1m X 1m under each treatment were considered as single replication. Nine plants were planted in each plot and five plants were selected randomly for collecting data. The strawberry plants taken from runners were planted during 1<sup>st</sup> week of November in the

raised beds with a distance of 30cm X 30cm. Plants were fertilized with N,P,K dose of 80:50:100 kg/ha respectively including 25 t/ha well rotten farm yard manure at different splits. Irrigation, weeding and plant protection measures were taken. The strawberry plants taken from runners were planted during 1st week of November in the raised beds with a distance of 30cm X 30cm. Plants were manure and fertilized with FYM @25 t/ha and N, P,K dose of 80:50:100 kg/ha respectively in the form of urea(N), single super phosphate(SSP) and Murate of potash(MOP). Irrigation, weeding, hoeing and plant protection measures were taken at timely basis (as and when required). As the plant growth is concerns, the maximum flower buds were pinched out at regular interval. Mulching was done after one month of planting with different mulches as different treatments in different beds by randomization for the replications. During the crop growth and development, periodic data was recorded for following parameters, viz., plant height (cm), canopy diameter (cm), number of leaves, leaf size (length and breadth of leaflet), leaf petiole length (cm) and leaf chlorophyll content (mg/100g). Data was statistically analyzed by the analysis of variance method (Gomez and Gomez ,1983) and the significance of variance were tested by Error Mean Square using Fisher Snedecor 'F' test of probability at 0.05 level of significance.

### 3. RESULT AND DISCUSSION

Growth and development in plant are a consequence of excellent coordination of several processes operating at different stages of the plant. This can be achieved through nutrient management, irrigation, cultural practices and plant protection measures (Prasad *et al.*, 2014). Significant effect of different mulches observed on most of the vegetative growth parameters of strawberry. Among the different mulches used in the experiment dominant effect of inorganic mulches over organic mulches was clearly indicating. Among the inorganic mulches significantly dominant results for all parameters were observed in plants under mulched with transparent polythene (T<sub>2</sub>) except leaf lamina length (cm) and petiole length (cm) of

strawberry, though the results were very close to the results of plants under transparent polythene mulch (T<sub>2</sub>). Experimental findings revealed that different mulches were significantly effected (Table 1) on plant height (cm), canopy diameter (cm), number of leaves, leaf size (average length of leaflet), leaf petiole length (cm) and there is no significant effect of mulches on leaf chlorophyll content (mg/100g). Among all the treatments highest plant height (24.80cm and 27.54 cm) was observed in plants under mulched with transparent polythene mulch (T<sub>2</sub>) and it is at par with black polythene mulch (T<sub>3</sub>) at 50 and 100 DAP. Similarly, the maximum Canopy diameter(34.39cm and 36.06cm) was observed in transparent polythene mulch (T<sub>2</sub>) and it was followed by glyricidia leaf mulch @5 t/ha(T<sub>4</sub>) at both stages(50DAP and 100 DAP). Regarding number of leaves per plant also shown increased trend (11.34 and 12.61) in transparent polythene mulch (T<sub>2</sub>) at both 50 DAP and 100DAP but it is at par with black polythene mulch(T<sub>3</sub>) at 50 DAP and glyricidia leaf mulch @5 t/ha(T<sub>4</sub>) at 100 DAP. Indication of highest plant height and Canopy Diameter under polythene mulched plots may be due to thick, matted surface covering capacity of polythene mulches helps to better water retention and nutrient availability to the plant. The results are in agreement with findings of Rajbir *et al.* (2006). Production of highest number of leaves per plant under transparent polythene may be due to the transparent soil cover which perhaps led to better conservation of moisture, soil heat including the light penetration and better biological function of soil. The results are coincides with result of Kour and Singh (2009) under polythene mulch. Maximum length(24.80cm and 27.54cm) of leaf lamina was observed in plants under mulched with transparent polythene mulch (T<sub>2</sub>) and it is at par with black polythene mulch(T<sub>3</sub>). The significant effect of mulching was not observed in breadth of leaf lamina at 50 DAP even though, numerical increase was observed in transparent polythene mulch (T<sub>2</sub>) plots but at 100 DAP different mulches significantly effected the breadth of leaf lamina and maximum breadth (10.14cm) was observed in plots under transparent polythene mulch (T<sub>2</sub>) and it is at par with black polythene mulch(T<sub>3</sub>).

**Table 1: Effect of different mulch materials on plant height, canopy diameter and number of leaves, leaf size (length and breadth of leaflet), petiole length and leaf chlorophyll content of strawberry.**

Treatments	Plant height (cm)		Canopy Diameter (cm)		No. of Leaves		Lamina length(cm)		Lamina breadth(cm)		Petiole length (cm)		Leaf chlorophyll content (mg/100g)	
	50 DAP	100 DAP	50 DAP	100 DAP	50 DAP	100 DAP	50 DAP	50 DAP	50 DAP	100 DAP	50 DAP	100 DAP	50 DAP	100 DAP
T <sub>0</sub>	20.52	23.24	26.75	29.04	8.11	9.74	8.02	8.87	8.16	8.92	10.06	12.22	37.05	40.21
T <sub>1</sub>	23.21	25.28	30.33	33.73	9.50	10.57	8.53	9.51	8.34	9.43	13.51	15.78	39.52	41.75
T <sub>2</sub>	24.80	27.54	34.39	36.06	11.34	12.61	9.19	10.05	9.14	10.14	13.09	14.88	43.11	45.46
T <sub>3</sub>	24.06	26.21	31.04	33.19	10.32	11.15	9.30	10.09	8.47	10.04	13.99	15.71	42.37	44.23
T <sub>4</sub>	22.83	24.85	32.23	34.01	10.06	11.26	8.27	9.45	8.51	9.35	13.46	14.47	40.48	41.98
T <sub>5</sub>	21.25	23.37	31.15	32.44	8.59	10.13	8.06	8.96	8.38	9.22	11.77	13.48	39.26	41.06
CD <sub>0.05</sub>	0.72	0.95	1.11	1.03	0.88	0.75	0.43	0.40	NS	0.57	0.82	0.96	NS	NS
SE <sup>±</sup> .m	0.40	0.51	0.57	0.48	0.48	0.31	0.25	0.23	NS	0.30	0.47	0.51	NS	NS

DAP: Days After Planting, NS-Non significant, T<sub>0</sub>: No Mulch, T<sub>1</sub>: Straw Mulch, T<sub>2</sub>: Transparent Polythene Mulch, T<sub>3</sub>: Black Polythene Mulch, T<sub>4</sub>: Leaf Mulch and T<sub>5</sub>: Paper Mulch

Highest petiole length(13.99cm) at 50 DAP was observed in black polythene mulch(T<sub>3</sub>) which is at par with Straw mulch @5 t/ha but at 100 DAP highest in this regard was observed in transparent polythene mulch (T<sub>2</sub>) followed by T<sub>3</sub>. Leaf chlorophyll content (mg/100g) was not significantly effected by different types of mulches at both the stages(i.e.,50DAP and 100 DAP). Higher leaf and petiole size was reported by Sharma and Sharma (2003) when polythene mulch was used. Different mulches positively influenced the leaf size observed by Caruso (1997). Thus the reports of Sharma and Sharma (2003) and Caruso (1997) supports the findings of the present experiment. Based on the stastical analysis processed data clearly indicates that lowest results regarding all the observations in the experiment were observed in plant under no mulched condition (T<sub>0</sub>). Under no mulch condition different plant growth parameters like plant height , canopy diameter , number of leaves, leaf lamina length, leaf lamina breadth and leaf petiole length were observed as 20.52 cm and 23.24cm,26.75cm and 29.04cm,8.11and 9.74,8.02cm and 8.87cm 8.16 and 8.92,10.06cm and 12.22cm,respectively at 50DAP and 100DAP. Due to lack of covering material on no mulched plots increased water evaporation, decreased availability of soil-moisture and the dissolved nutrients which necessary for good growth.

#### 4. CONCLUSION

From results of the present experiment it may be concluded that different mulches used in the present experiment (like transparent polythene mulch, black polythene mulch, leaf mulch and paper mulch etc.) significantly effected the growth of strawberry plants with respect to different plant growth parameters like plant height, number of leaves, leaf size, canopy diameter etc. Highest plant height, greater plant

canopy, higher leaf size has been observed under transparent polythene mulch. Thus transparent polythene mulch may be used for better vegetative growth of strawberry (cv. Tioga) under Red and Lateritic zone of West Bengal.

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