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## Assessment of various mulching materials on growth and yield of acid lime

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### Abstract

In present investigation Assessment of various mulching materials on Growth and yield of Acid Lime (*Citrus aurantifolia* Swingle L.) Cv. Sai Sharbati. Experiment Conducted in a already well-established orchard of nine year old plants at 6 x 3 m spacing during Ambiya bahar 2019-2020. The research was conducted at Sweet Orange Research Station Badnapur, Dist. Jalna, Maharashtra. The experiment was carried out in RBD with 10 treatments and 3 replications. In present experiment, mulching materials significantly influenced on growth parameters. Highest increased on plant height (8.08%), plant spread in E-W (8.20%) and N-S Direction (8.33%) and shoot length (13.68 cm) was recorded in T<sub>2</sub>. The treatment T<sub>2</sub> (polythene mulch with black side facing) observed significant influence on yield and yield attributing parameters viz., the highest number of fruit/tree (1136), yield per tree (61.68 kg) and yield per ha (34.24t). The treatment T<sub>2</sub>- Polythene mulch with black side facing (100 µ) significantly increase growth and yield of Acid Lime as compared to other mulching materials.

**Keywords:** Mulching, acid lime, polythene mulch, black, growth, yield, fruit

### Introduction

Acid lime is originated in North-Eastern India is one of the largest growing and ever-demanding citrus groups of fruit cultivated in India. It is generally grown under tropical and arid or semi-arid climatic condition which is a great plus point for cultivation across the India to farm the evergreen citrus fruit. In the plain above 1000 m from mean sea level and optimum temperature requirement is 20-300 C, Soil pH of 6.4 to 7.5 should be considered as ideal for acid lime production. In more humid region, where rainfall is above 1250 mm. But now a days the soil moisture condition become very limiting factor in dry areas due to uneven rainfall and acid lime exposed due to prolonged moisture stress in dry period December-May due to high rate of evapotranspiration that lead to the production of poor quality of fruit, which become a limiting factor for export quality fruit production and along with them weeds and pest compromise the crop productivity through competition for resources which including water, nutrient and light. Different cultural and management practices used for increase yield and fruit quality, among that, mulching is the most important cultural practices which effect on growth, yield and quality in fruit crop production (Bakshi *et al.* 2015) [2]. Use of Mulches are various reasons in agriculture but mainly water conservation and erosion control are most important object particularly in arid and semi-arid region.

### Materials and Methods

The present investigation was carried out at Sweet Orange Research Station, Badnapur, during year 2019-2020. Experiment Conducted in a already well-established orchard of nine year old plants at 6 x 3 m spacing during Ambiya bahar 2019-2020. The experiment consisting of ten treatments with in Randomized Block Design with three replications. (Panse and Sukhatme, 1985) [6]. Two trees were used for each treatment. The experiment site was uniform with gentle slope. The soil was medium black slightly alkaline with uniform texture, colour and having good drainage. The Sai Sharbati acid lime trees grown on medium type soil planted at 6 x 3 m spacing of nine years age having uniform growth and vigor were subjected to bahar treatment by withholding irrigation water during November 2019. The various operations like land preparation, removal and disposal of diseased fruits of previous bahar, preparation of basins, weeding and plant protection were carried out before start of experiment. Protective irrigations were given as per the need during drought period through drip to all the experimental trees particularly during fruit development Stage.

## Results and Discussion

### Vegetative Growth Parameters

Vegetative characters of acid lime like, plant height and plant spread (E-W and N-S) and shoot length are presented in Table 1. The data clearly showed that, plant height, plant spread and shoot length were significantly influenced due the application of various mulching materials.

The data revealed that significantly maximum plant height (0.30 m, 8.08%), plant spread [E-W (0.32 m, 8.20%) and N-S (0.39 m, 8.33%)] and shoot length (13.68 cm) was recorded in the treatment T<sub>2</sub>. The treatment T<sub>1</sub> recorded significantly minimum plant height (0.10 m, 2.94%), plant spread [E-W (0.12 m, 3.23%) and shoot length (8.11 cm). but N-S (0.16 m, 4.45%) spread was in treatment T<sub>7</sub>.

The results obtained in the investigation indicated that the continuous growth of acid lime in terms of plant height, trees spread and shoot length was influenced by various types of mulching materials. The experimental results showed that T<sub>2</sub>

(polythene mulch with black side facing) recorded highest percent increase in plant height as well as canopy spread in East-West direction and North-South direction and shoot length and was followed by treatment T<sub>3</sub>, T<sub>10</sub>, T<sub>8</sub>, T<sub>4</sub>, T<sub>6</sub>, T<sub>9</sub> and the minimum was in T<sub>1</sub>.

Tree's growth was greatly influenced by the use of different organic and inorganic mulching treatments which conserve soil moisture in the root zone of fruit trees. Water play crucial role in the growth and development of plant. The presence of adequate moisture in soil is vital for plant growth and physiological processes. The ideal soil moisture conservation along with lower weed intensity due to mulching material. The increase in growth of plant was due to increase in availability of soil moisture, nutrient and less evaporation from soil surface (Shirgure *et al.* 2005)<sup>[8]</sup>. Maximum plant height, plant spread, under the polythene mulch was recorded whereas, it was the minimum in control. (Bakshi *et al.* 2014)<sup>[1]</sup>.

**Table 1:** Effect of various mulching materials on vegetative growth characters

Treatment	Plant height				Plant spread {E-W}				Plant spread (N-S)				Shoot length
	Initial (m)	At harvest (m)	Increase In height (m)	% Increase	Initial (m)	At harvest (m)	Increase In height (m)	% Increase	Initial (m)	At harvest (m)	Increase In height (m)	% Increase	Increase (Cm)
T <sub>1</sub>	3.40	3.50	0.10	2.94	3.71	3.83	0.12	3.23	3.64	3.81	0.17	4.67	8.11
T <sub>2</sub>	3.71	4.01	0.30	8.08	3.90	4.22	0.32	8.20	4.68	5.07	0.39	8.33	13.68
T <sub>3</sub>	3.65	3.90	0.25	6.84	4.03	4.29	0.26	6.45	4.26	4.58	0.32	7.51	12.04
T <sub>4</sub>	3.57	3.74	0.20	5.60	3.85	3.99	0.14	3.63	4.18	4.42	0.24	5.74	9.57
T <sub>5</sub>	3.54	3.66	0.12	3.38	3.78	4.01	0.23	6.08	3.63	3.87	0.24	6.61	8.46
T <sub>6</sub>	3.77	3.61	0.16	4.24	3.51	3.65	0.14	3.98	4.15	4.39	0.24	5.78	8.71
T <sub>7</sub>	3.50	3.63	0.13	3.71	3.86	3.99	0.13	3.36	3.59	3.75	0.16	4.45	8.55
T <sub>8</sub>	3.53	3.74	0.21	5.94	3.75	3.99	0.24	6.4	4.36	4.62	0.26	5.96	9.99
T <sub>9</sub>	3.43	3.57	0.14	4.08	3.79	3.93	0.14	3.69	4.64	4.83	0.19	4.09	8.75
T <sub>10</sub>	3.59	3.81	0.22	6.12	3.90	4.09	0.19	4.87	3.63	3.94	0.31	8.5	11.15
S.E (±)	0.11	0.01	0.02	-	0.10	0.25	0.01	-	0.12	0.25	0.04	-	0.16
CD at 5%	NS	0.04	0.08	-	NS	0.77	0.03	-	NS	0.76	0.10	-	0.47

### Yield parameters

The data on effect of various mulching materials on yield parameter of acid lime are presented in Table 2. Data shows that, there were significantly difference with regards to number of fruit per tree, yield kg per tree, yield tons per hectare due to various mulching treatment application.

Significantly maximum number of fruits (1136) was recorded in T<sub>2</sub> and followed by T<sub>3</sub> (1115.2) and for fruit yield (kg) per tree is significantly maximum (61.68 kg) was recorded in T<sub>2</sub> and followed by T<sub>3</sub> (59.22 kg). Significantly maximum yield per hectare (34.24 t) was recorded in the treatment T<sub>2</sub>.

The maximum values of these parameter were recorded with T<sub>2</sub> and followed by treatment T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub>, T<sub>9</sub> and T<sub>8</sub> respectively. Number of fruit per plant, yield kg per plant and yield tone per hectare were significantly affected because of mulching treatment. Less the evaporation higher water availability for plants to dry matter production.

Effects of mulching on the growth and yield of guava cv. Sardar and reported that the plants under black polythene mulch produced maximum yield (Patra *et al.* 2004)<sup>[7]</sup>. Mulching of plant basin and watering in dry period significantly improved the yield of sweet orange (*Citrus sinensis*. L) (Ghosh *et al.* 2009)<sup>[4]</sup>.

The impact of different mulching materials significantly higher fruit yield under transparent polythene mulch followed by black polythene mulch while it was minimum in control (Bal and Singh. 2011)<sup>[3]</sup>. Mulches are mainly used for soil

moisture conservation, weed reduction practices which is directly affect on growth and yield. And this is superior under the black polythene mulch and followed by grass mulch (Shirgure *et al.* 2003)<sup>[9]</sup>.

Significant increase in growth and yield were observed treatment T<sub>2</sub> (polythene mulch with black side facing). The same finding earlier was reported Kumar and Nath (2008)<sup>[5]</sup> that highest yield in fruit under the black polythene mulch treatment and least yield in control.

**Table 2:** Effect of various mulching materials on yield and yield attributing characters

Treatment	No. of fruit/tree	Yield kg/tree	Yield (t)/ha
T <sub>1</sub>	1029.60	52.72	29.25
T <sub>2</sub>	1136.01	61.68	34.23
T <sub>3</sub>	1115.20	59.22	32.87
T <sub>4</sub>	1095.20	56.62	31.43
T <sub>5</sub>	1093.60	56.43	31.32
T <sub>6</sub>	1084.80	55.65	30.89
T <sub>7</sub>	1056.01	55.02	30.53
T <sub>8</sub>	1081.60	55.38	30.73
T <sub>9</sub>	1083.20	56.00	31.08
T <sub>10</sub>	1056.60	54.73	30.38
SE±	28.17	2.12	1.18
CD at 5%	84.87	6.41	3.55

## Conclusion

Mulching practice decrease the rate of evaporation ultimately more availability of soil moisture and more the soil moisture in scare condition having more the water use efficiency ulimatly more the yield. Higher water availability and less evaporation losses in treatment T<sub>2</sub> (polythene mulch with black side facing) So higher the plant height and plant spread (E-W and N-S), shoot length, number of fruit per tree, yield kg per tree, yield tons per hectare.

Since in future selection of suitable mulching material is necessary therefore, appropriate mulching material use to avoid evaporation losse

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## References

1. Bakshi P, Bhat DJ, Wali V, Sharma A, Iqbal M. Growth, yield and quality of strawberry (*Fragaria x ananassa* Duch.) cv. Chandler as influenced by various mulching materials. Afr J Agric Res. 2014;9(7):701-706.
2. Bakshi P, Wali VK, Iqbal M, Jasrotia A, Kour K, Ahmed R, *et al.* Sustainable fruit production by soil moisture conservation with different mulches - A review. Afr J Agric Res. 2015;10(52):4718-4729.
3. Bal JS, Singh S. Effect of mulching materials and herbicides on tree growth, yield and fruit quality of Ber. Indian J Hort. 2011;68(2):189-192.
4. Ghosh SN, Duttaray SK, Megu O. Effect of mulching and irrigation on fruit yield and quality of sweet orange (*Citrus sinensis* L. Osbeck) cv. Mosambi. Int J Agric Environ Biotechnol. 2009;2(1):42-45.
5. Kumar D, Pandey V, Nath V. Effect of organic mulches on soil moisture conservation for rainfed turmeric production in mango orchard. Indian J Soil Conserv. 2008;36(3):188-191.
6. Panse VC, Sukhatme PV. Statistical methods for Agriculture workers. ICAR, New Delhi. 4<sup>th</sup> Edn; c1985.
7. Patra RK, Debnath S, Das BC, Hassan MA. Effect of mulching on growth and fruit yield of guava cv. Sardar. Orissa J Hort. 2004;32(2):38-42.
8. Shirgure PS, Singh S, Panigrahi P, Sonkar RK. Evaluation of mulches for improving bearing in acid lime. Indian J Soil Conserv. 2005;33(1):62-66.
9. Shirgure PS, Singh S, Panigrahi P, Sonkar RK. Evaluation of mulches for improving bearing in acid lime. Indian J Soil Conserv. 2003;33(1):62-66.