

Original Research Article

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Influence of Mulching Material on Growth and Yield of Strawberry under Polyhouse Condition

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ABSTRACT

The present experiment were carried out at the research field of Horticultural Research Farm, Andro, Central Agricultural University, Imphal, which is 27km from CAU during Oct,2018-19,Mar. The experimental site is located at latitude of 24°45.89' N and longitude of 94°03.46' S, at an altitude of 880m above mean sea level. The experiment was conducted to chalked out the best mulching and variety and their combined effect on plant growth and yield. Mulching consist of Straw mulch (M2), Black polyethylene (M1), Saw dust (M3) and cultivars Sweet Charlie (V1) and Chandler (V1). The total treatment consist of 8. It was two factorial experiment comprising 8 treatment combinations with three replications. Hence the design of the experiment was Factorial Randomized Block Design and total number of seedlings used were 480 with 20 seedlings per treatment per replication. From the data recorded after analysed, it was noticed that the parameters showed significant variations because of effect of two factors. With regard to mulching applied, highest plant height(21.84cm), Crown spread(29.85cm), number of leaves per plant(17.07), leaf area (77.38cm²), single fruit weight (9.84g) and yield(2.51t/ha) were observed in Straw mulch. As for cultivar is concerned Chandler (V2) reported maximum in the parameters mentioned plant height (20.20cm), crown spread (28.08cm), number of leaves per plant (15.90), leaf area (73.45cm²), single fruit weight (8.06g), yield (1.84t/ha) and Sweet Charlie (V1) observed minimum value. For the combined influence of two factors mentioned earlier Straw Mulch (M2) with Chandler (V2) i.e M2V2 observed maximum in the given parameters while M0V1 (Control x Sweet Charlie) observed minimum value. Therefore it can be inferred that Straw mulch (M2) when mulch in Chandler (V2) gave better result for the growth and yield parameters.

Keywords

Mulching, Sweet Charlie, Chandler, Parameters, Cultivar

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Introduction

Strawberry (*Fragaria x ananassa* Dutch.) is one of the most important temperate fruit which can also be grown in tropical and sub – tropical climate with some efforts. It is a

herbaceous perennial crop belonging to family Rosaceae. It is a small fruit crop of great nutritional and medicinal value (Maas *et al.*, 1991). Scientifically, strawberry is said to be an aggregate fruit as it is derived from the receptacles rather than plant ovary.

Various berry fruits along with low growing *Rubuspseudo-japonica* and Japanese strawberry species were introduced in the middle of the 10th and 18th centuries in the ancient world “ichibigo” in Japan (Oda and Nishimura, 2009). In India, strawberry is grown in Himachal Pradesh, Maharashtra, West Bengal, Delhi, Haryana, Punjab and Rajasthan in an area of one million hectare with a production of 8 million tonnes (Anonymous, 2015-16). In India, strawberry is usually planted in second fortnight of October with traditional methods which restrict the fruit availability for a short period of (one and half month). However, there are several reports available in the literature indicating that strawberry can be planted at different times of the year depending on the variety, location and climate (Sharma and Sharma, 2004). Among different production practices of strawberry, mulching is considered as the most important cultural practice as it plays an essential role in soil moisture conservation, weed control, regulation of soil hydrothermal regime, besides keeping the delicate fruit neat and clean as strawberry is a low growing perennial herb (Abbott and Gough, 1992; Gupta and Acharya, 1993 and Tarara, 2000).

Investigations on impact of different mulching materials on fruit quality has indicated that strawberry is very responsive to the different mulching materials and climatic conditions (Wang *et al.*, 1998; Raina *et al.*, 2004 and Shylla and Sharma, 2010).

Cultivation of strawberry in NE-region with special reference to Manipur in commercial scale is very rare as compare to non traditional cultivated area of India. Therefore, taking all points under considerations, the present study is designed to study the Influence of Mulching material on the growth and yield of strawberry under poly-house condition with the following objectives

include to find out the best mulching material. Then to find out the better cultivar and also to find out the best treatment combination.

Materials and Methods

An experiment was conducted at the Horticultural Research Farm, Andro, College of Agriculture, Central Agricultural University, Imphal during the year Oct,2018-2019 March, to evaluate the influence of mulching material on growth and yield of strawberry under polyhouse condition. The experiment was laid out in Factorial Randomized Block Design with eight treatment combination in three replications. The mulch used were Straw (M2), Black polyethylene (M1), Saw dust (M3) and Control (unmulch) (M0) while the cultivars were Sweet Charlie (V1) and Chandler (V2).

The growth and yield parameters recorded during the experiment were Plant height (cm), Crown Spread (cm), Leaf area (cm²), Number of leaves per plant, Single fruit weight (g), Yield (t/ha).

The Plant height were recorded in centimetre from the soil level to the tip of the plant. The plant spread was measured in two directions (NS and EW) at right angles to each other and average were work out. Leaf area were measured using leaf area meter 211. Numbers of leaves per plant were counted for each treatment. Weight of single fruit was measured for each treatment after harvest. The total fruit yield for each treatment was estimated in terms of t/ha.

Results and Discussion

Influence of mulching material and variety on growth and yield were found to be significantly differed. The relevant data and discussions have been presented below:

Influence of mulching and variety on growth and yield of strawberry

Result presented in Table 1 and 2, exhibited that mulching and varietal treatment increased the plant height, crown spread, leaf area, single fruit weight and yield. Among the mulching Straw Mulch recorded the maximum plant height (21.84 cm), Crown Spread (29.85cm), Leaf area (77.38cm²), single fruit weight (9.84g) and yield (2.51t/ha). Black polyethylene mulch observed the value on par with the Straw Mulch of the above parameters while minimum value were reported in Control.

The maximum value observed in straw mulch may be attributed to the better aeration around plant rhizosphere creating favourable atmosphere for nutrient uptake and translocating it to other parts of plant for synthesis of food material which then supplied to the fruit regularly during fruit development stage and also the plant vigour might also have contributed ultimately in the yield. Also straw conserved moisture which help in continuous supply of water and straw upon decomposition added nutrient to the soil. These above findings were in conformity with the earlier work of Misra (1996), S. Sujatha *et al.*, (2018), Ali and Gaur (2013) and Das *et al.*, (2010), Moor *et al.*, (2004).

Table.1 Influence of mulching and variety on growth of strawberry

Treatment	Plant height (cm)	Crown spread (cm)	Number of leaves per plant	Leaf area (cm ²)
Mulching Material				
M0	16.53	24.72	13.32	66.30
M1	21.34	28.17	16.04	73.40
M2	21.84	29.85	17.07	77.38
M3	17.84	26.23	15.08	68.66
SE(d)±	0.36	0.42	0.23	0.96
CD(0.05)	0.77	0.89	0.48	2.06
Variety				
V1	18.58	26.40	14.85	69.42
V2	20.20	28.08	15.90	73.45
SE(d)±	0.25	0.29	0.16	0.68
CD(0.05)	0.54	0.63	0.34	1.46
Mulching material and variety interaction (MxV)				
M0V1	15.97	23.47	13.05	65.88
M0V2	17.09	25.97	13.58	66.72
M1V1	20.19	28.01	15.49	70.46
M1V2	22.49	28.32	16.59	76.34
M2V1	20.90	28.15	15.99	73.54
M2V2	22.78	31.54	18.15	81.22
M3V1	17.24	25.98	14.87	67.81
M3V2	18.44	26.47	15.29	69.51
SE(d) ±	0.51	0.59	0.32	1.36
CD(0.05)	1.08	1.26	0.69	2.91

Table.2 Influence of mulching and variety on yield of strawberry

Treatment	Single fruit weight (g)	Yield (t/ha)
Mulching Material		
M0	4.61	1.00
M1	8.70	1.74
M2	9.84	2.51
M3	6.17	1.19
SE(d)±	0.11	0.03
CD(0.05)	0.24	0.07
Variety		
V1	6.73	1.37
V2	8.06	1.84
SE(d)±	0.08	0.02
CD(0.05)	0.17	0.05
Mulching material and variety interaction (MxV)		
M0V1	4.61	0.86
M0V2	5.11	1.14
M1V1	7.50	1.28
M1V2	9.90	2.19
M2V1	8.70	2.18
M2V2	10.98	2.83
M3V1	6.10	1.16
M3V2	6.23	1.21
SE(d) ±	0.16	0.05
CD(0.05)	0.34	0.10

As reported for cultivars, Chandler noticed the maximum Plant height (20.20cm), Crown Spread (28.08cm), Leaf area (73.45cm²), number of leaves per plant (15.90), single fruit weight (8.06g) and yield (1.84t/ha). Sweet Charlie reported the minimum value. The higher value reported in cultivar Chandler may be due to the varietal genetic background which may also have been favoured by the microclimate during their growth period which in turn translate into yield. The present findings were found to be similar with the previous findings of Umesh Kumar *et al.*, (2020), Amarjeet Kaur *et al.*, (2017), A. Kumar and I. Ahad (2012).

For treatment combination M2V2 (Straw Mulch x Chandler) were reported higher in

growth aspect viz. Plant height(22.78cm), Crown spread(31.54cm), number of leaves per plant(18.15), leaf area(81.22cm²), single fruit weight (10.98g) and yield(2.83t/ha).

From the above mentioned explanation and data, it can be summarised and conclude that Straw mulch were found to be beneficial as compared to other mulch taken in terms of plant height (cm), crown spread (cm), number of leaves per plant, leaf area (cm²), single fruit weight (g) and yield (t/ha) where as Chandler (V2) reported maximum value of the above parameters than Sweet Charlie (V1).

The treatment combination M2V2 (Straw Mulch x Chandler) were found to be

maximum in all the parameters plant height (22.78cm), crown spread (31.54cm), number of leaves per plant (18.15), leaf area (81.22cm²), single fruit weight (10.98g) and yield (2.83t/ha) and M0V1 (Control x Sweet Charlie) were found to be minimum in all these parameters.

Thus it can be inferred from this work that, for this area it was observed that straw mulch were found to impart beneficial effect in terms of growth and yield from the rest of the mulch used and for cv. Chandler (V2) performed better than Sweet Charlie (V1) in terms of growth and yield. For treatment combination M2V2 were better than other treatment combination and M0V1 were found minimum in terms of growth and yield.

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