Original Research Article

EFFECT OF ~~MULCING~~ MULCHING ON GROWTH, YIELD AND QUALITY ATTRIBUTES OF (*Fragaria x ananassa*)" IN DEHRADUN VALLEY OF UTTARAKHAND

Abstract

Present experimental research was conducted during the year 2020-21 at Horticulture Research block, School of Agriculture Sciences, SGRR University, Dehradun, Uttarakhand to study the "Effect of Mulching on Growth, Yield and Quality Attributes of Strawberry (Fragaria X ananassa) in Dehradun Valley of Uttarakhand". The field experiment was laid out in randomized block design with three replications and three treatments. The treatments were comprised with different mulching materials viz. control as without mulching (T1), Straw mulching (T2) and Polythene mulching (T3). The planting of cultivar "Chandler" was done on first week of November, 2020 and observations were recorded at 30 DAT, 60 DAT, 90 DAT, 120 DAT, 150 DAT and at final harvest. Significant results were obtained for different attributes of growth, yield, quality as well as in terms of economics under the treatment of black polythene mulching (T3). The results showed that the Number of Flowers per Plant (24.08), Plant spread (48.06 cm), Fruit length (4.22 cm), Fruit diameter (3.80 cm), Fruit texture (5.9 lb), T.S.S. (8.92 ^{0}Brix) and Total juice content (84.05 %) However, the control (T1) reported maximum Titrable acidity (0.92 %).

Keywords- Chandler, Economics, Mulching, Randomized,Runners.

Introduction

Strawberry (*Fragaria x ananassa*) belongs to the family Rosaceae, is one of the important soft fruit of the world and has resulted from a cross between two wild strawberries: *Fragaria virginiana* (Meadow strawberry) and *Fragaria chiloensis* (Chilean strawberry). It is a herbaceous perennial plant which can be successfully cultivated in wide range of Agroclimatic conditions from subtropics to temperate climate.

It is a rich source of Vitamin A (60 IU/100 g of edible fruit), Vitamin C (30-120 mg/100g of edible portion), Vitamin B1, niacin, Proteins and minerals like Phosphorous, Potassium, Calcium and Iron. The presence of ellagic acid, which prevents cancer and occurrence of heart diseases and the abundance of anthocyanins have made it a more valuable fruit. The heart-shaped silhouette of the strawberry is the first clue that this fruit is good for health. These potent little packages protect your heart, lower your blood pressure, and guard against cancer. Packed with Vitamins, Fibre, and particularly high levels of antioxidants known as polyphenols helps in Wrinkle-prevention, strawberries are a sodium-free, fat-free, cholesterol-free, low-calorie food. They are among the top 20 fruits in antioxidant capacity and are a good source of manganese and potassium **~~(S.K.~~ Singh, 2019)**.

The plastic materials used as mulch are poly vinyl chloride or polyethylene films. Owing to its greater permeability to long wave radiation it can increase temperature around the plants during night in winter. Hence, polyethylene film mulch is preferred as mulching material for crop production (**Nautiyal *et al.*, 2017a**). Now a day application of black plastic mulch film is becoming popular and very good results have been achieved particularly in rain fed agriculture (**Nautiyal *et al.*, 2017b**). The black polyethylene mulch also checks all types of weeds in addition to soil moisture conservation therefore, black plastic mulch is more beneficial **(McCann *et al.*, 2007).**

Mulching reduces soil temperature in summer and raises it in winter. It prevents the extremes of temperatures. During summer, mulching conserves the soil moisture due to reduced evaporation. The cooling effect of soil promotes root development. In general, the effect of mulching on the temperature regime of the soil varies according to the capacity of the mulching material to reflect and transmit solar energy. Mulches results in greater water content and lower the evaporation (**Semwal *et al.*, 2022**). White mulches decrease soil temperature while clear plastic mulches increase soil temperature. The soil temperature can be higher up to 70C under clear mulch compared to bare soil. At night, condensation on the underside of the mulch absorbs the long wave radiation emitted by the soil thereby slowing cooling of the soil **(Lamont, W. J. 2005).** The ability of clear mulches to produce soil temperatures high enough to control weeds, plant pathogens and nematodes forms the basis for the soil solarization process.

Materials and Method

The field experiment was conducted on 2020-21 in the Horticulture Research Block of School of Agricultural Sciences, SGRR University, Dehradun, Uttarakhand. The experiment was laid out in Randomized block design with three replications. Each replication consisted of three treatments. All the treatments were randomized separately in each replication.

List 1 : Treatment Details

Treatment Symbol	Treatment Combination
T_1	Control (without any mulching)
T_2	Paddy straw mulching
T_3	Black polythene mulching

Results and Discussion

The findings of the present investigation were recorded and are thoroughly discussed below:

Number of Flowers

Bothstraw and black polythene mulches recorded higher number of flowers as compared to control. However, the maximum number of flowers per plant (62.71) was obtained under black polythene mulching (T_3). This might be attributed to more number of flowers produced by vigorous plants under black polythene mulch, which is in conformity with the findings of **Nagalakshmi *et al.*, (2002).**

Plant Spread (cm)

Plant spread was found significantly maximum (48.06) under black polythene mulching (T_3) as compared to rest of the treatments. This might be due to the presence of

adequate moisture in the soil which is vital for plant growth not only because plant needs water for their physiological processes but also for nutrient solubility and their availability in soil solution (**Kumar and Dey, 2011)**.

Fruit Length (cm) and Fruit Diameter (cm)

Fruit length (4.22 cm)and fruit diameter (3.80 cm) under black polythene mulch (T_3) was found significantly higher in comparison to all other treatments. The larger fruit size under black polythene mulch was attributed to more plant growth and development under micro-climatic condition resulting in better nutrient uptake. Increase in fruit size due to mulching had also been reported by **Nagalakshmi *et al*., (2002).**

T.S.S. (^{0}Brix) and Total Juice Content (%)

The data depicts that the application of black polythene mulch recorded maximum T.S.S. (8.92°B) and total juice content (84.05 %). Higher fruit quality is related to weed free environment, higher moisture conservation and maximum nutrient uptake under black polythene mulch treatment. These results are in conformity with the findings of (**Mathad and Jholgiker, 2005)** and **Singh *et al.*, (2007).**

Titrable Acidity (%)

The titrable acidity was high in fruits harvested from the control treatment (T_3) (0.92%). The variation in titrable acidity of strawberry fruits harvested from the plants applied with different mulches might be due to variation in the translocation of photo assimilates from source to sink. These results were in conformity with the findings of **Verma *et al.*, (2005)** and **Das *et al.*, (2010)** in guava.

Conclusion

On the basis of present experimental research on "Effect of Mulching on Growth, Yield and Quality Attributes of Strawberry (*Fragaria X ananassa*) in Dehradun Valley of Uttarakhand" in cultivar "Chandler", it can be concluded that among different mulching materials, black polythene mulch (T_3)was found to be most effective for influencing various growth parameters such as- number of flowers /plant, plant spread (cm), yield parameters like fruit

length (cm), fruit diameter (cm), fruit texture (lb) and quality parameters like T.S.S. (^{0}Brix) and total juice content (%). However, the titrable acidity (%) was found maximum in control (T_1)

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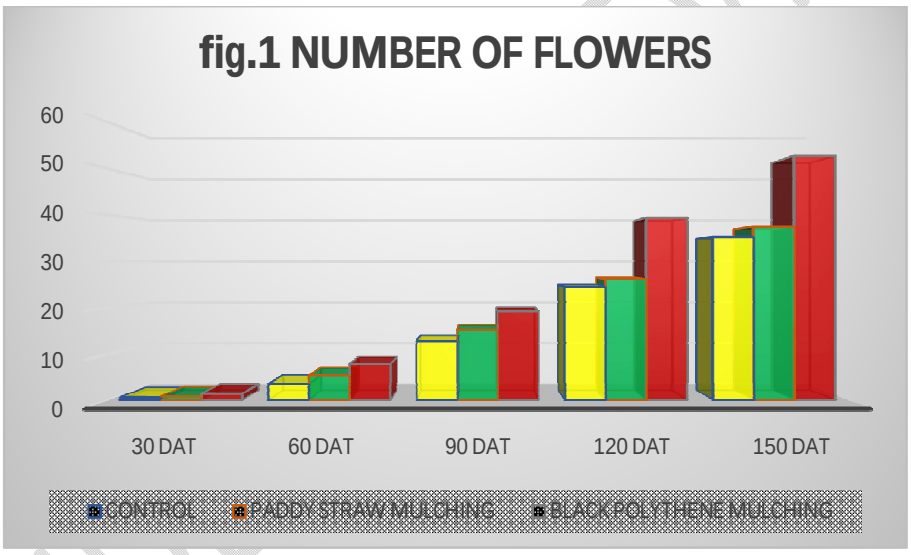
Table 1: GROWTH PARAMETERS

Treatment	Number of Flowers/ Plant	Plant Spread (cm)
T_1	15.30	29.624
T_2	16.97	30.946
T_3	24.08	39.994
C.D. (P=0.05)	5.91	1.97
SE(m) ±	1.78	0.59
SE(d) ±	2.52	0.84
C.V.	19.25	3.96



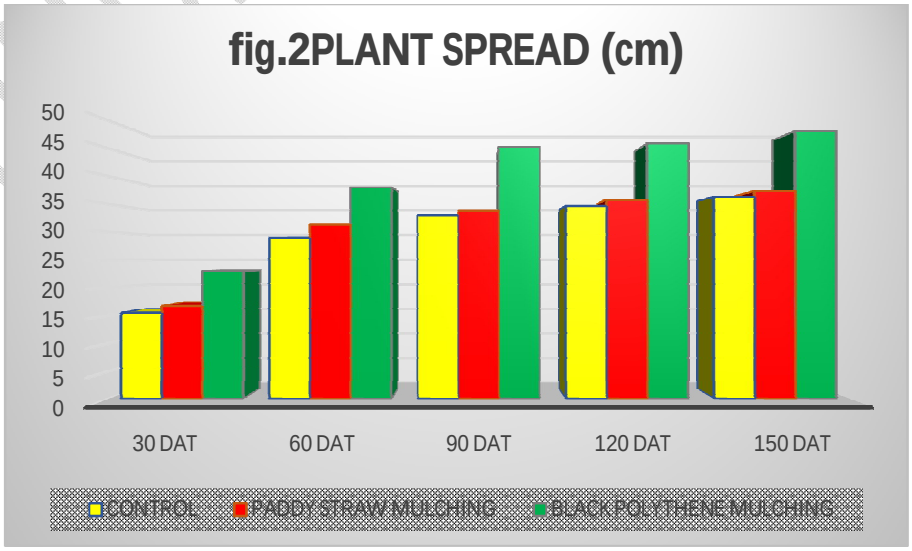
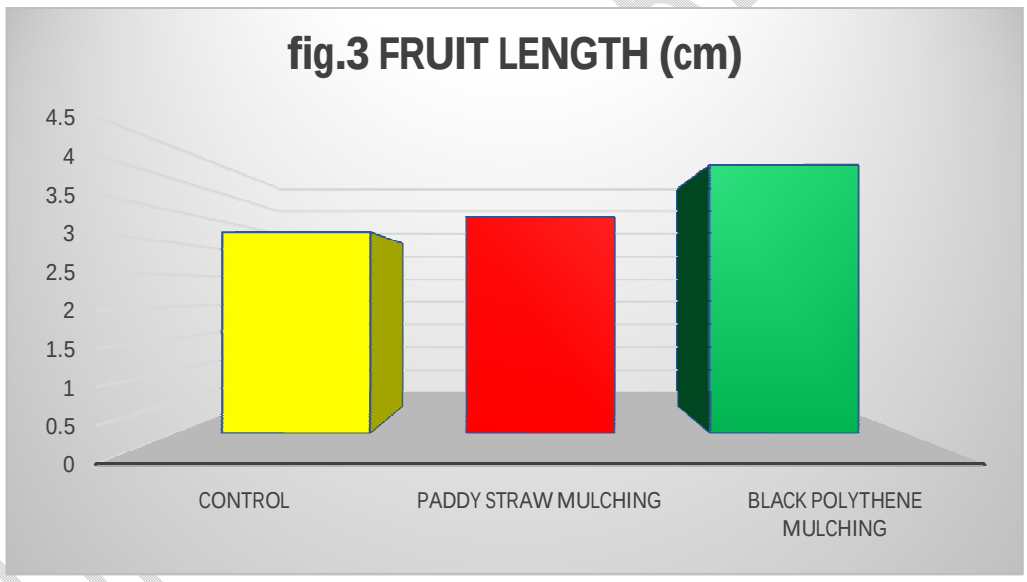
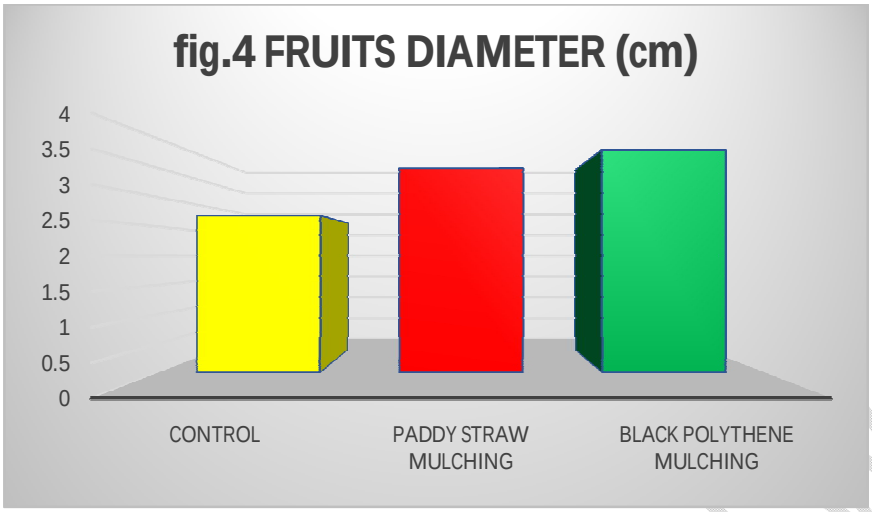


Table 2 : YIELD PARAMETERS

Treatment	Fruit Length (cm)	Fruit Diameter (cm)	Fruit Texture (lb.)
T_1	3.16	2.68	5.1
T_2	3.40	3.49	5.5
T_3	4.22	3.8	5.9
C.D. (P=0.05)	**0.24**	**0.19**	**N/A**
SE(m) ±	**0.06**	**0.04**	**0.32**
SE(d) ±	**0.08**	**0.06**	**0.46**
C.V.	**2.89**	**2.53**	**10.36**





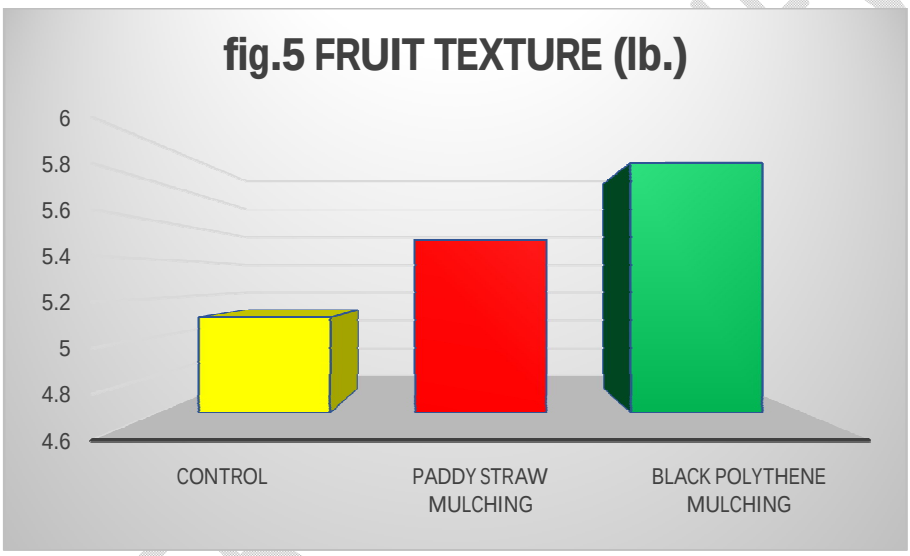


Table 3 : QUALITY PARAMETERS

Treatment	T.S.S. (^{0}Brix)	Juice Content (%)	Titrable Acidity (%)
T_1	6.88	67.86	0.92
T_2	7.54	72.14	0.81
T_3	8.92	84.05	0.72
C.D. (P=0.05)	**0.80**	**0.22**	**0.085**
SE(m) ±	**0.20**	**0.05**	**0.021**
SE(d) ±	**0.28**	**0.07**	**0.030**
C.V.	**4.46**	**0.12**	**4.471**

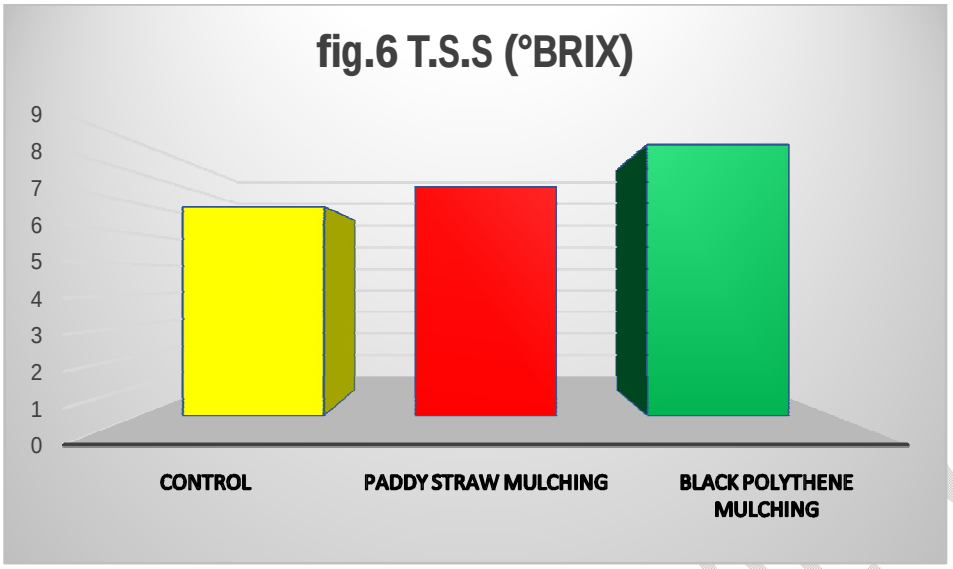


fig.6 T.S.S (°BRIX)
9
8
7
6
5
4
3
2
1
0
CONTROL
PADDY STRAW MULCHING
BLACK POLYTHENE MULCHING

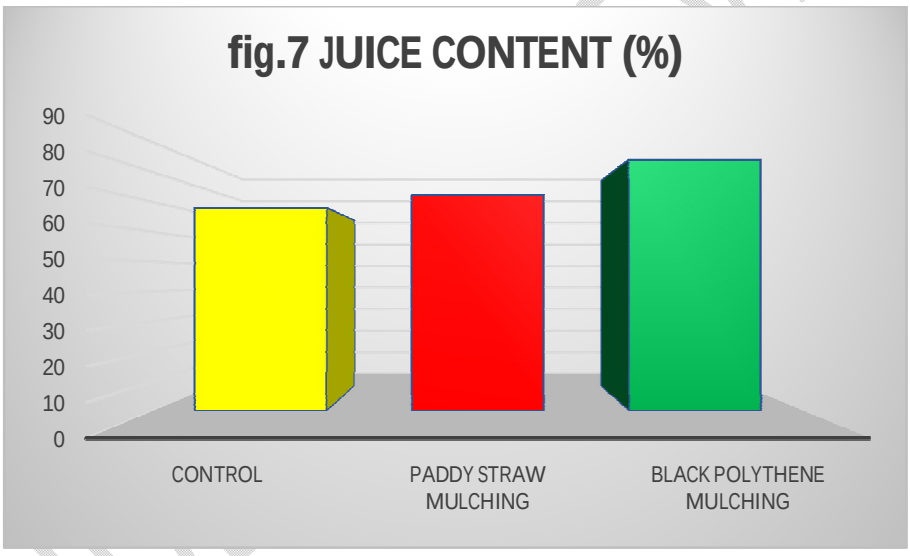


fig.7 JUICE CONTENT (%)
90
80
70
60
50
40
30
20
10
0
CONTROL
PADDY STRAW MULCHING
BLACK POLYTHENE MULCHING