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Navaraj Kumar Mandal
M.Sc. Student, Department of Horticulture, Faculty of Agricultural Sciences and Allied Industries, Rama University, Kanpur, Uttar Pradesh, India

Jitendra Kumar
Assistant Professor, Department of Horticulture, Faculty of Agricultural Sciences and Allied Industries, Rama University, Kanpur, Uttar Pradesh, India

Vinay Joseph Silas
Teaching Associate, Department of Horticulture, Faculty of Agricultural Sciences and Allied Industries, Rama University, Kanpur, Uttar Pradesh, India

Aneeta Yadav
Dean, Associate Professor, Faculty of Agricultural Sciences and Allied Industries, Rama University, Kanpur, Uttar Pradesh, India

Mukesh Kumar Yadav
M.Sc. Student, Department of Horticulture, Faculty of Agricultural Sciences and Allied Industries, Rama University, Kanpur, Uttar Pradesh, India

Corresponding Author:
Navaraj Kumar Mandal
M.Sc. Student, Department of Horticulture, Faculty of Agricultural Sciences and Allied Industries, Rama University, Kanpur, Uttar Pradesh, India

Impact of different types of mulch on growth and yield attributes of chilli (*Capsicum annuum*) var. Pusa Jwala) under Kanpur agro climate condition

Navaraj Kumar Mandal, Jitendra Kumar, Vinay Joseph Silas, Aneeta Yadav and Mukesh Kumar Yadav

Abstract

Field experiments were conducted at horticultural field of Rama University, Kanpur India on The Study on different types of mulch on the growth and yield of chilli, pusa jwala (*Capsicum annuum* L.) under Kanpur Agro climate conditions experiment was laid out in RBD considering eight treatments. The variety Pusa jwala was selected and the combinations of treatment were T₁= paper mulch; T₂= leaf mulch; T₃= jute mulch; T₄= straw mulch; T₅= white plastic mulch; T₆=grass mulch; T₇= black plastic mulch; T₈= No mulch.

The plant height is measure maximum in T₇ (57.44cm) whereas that minimum height of plant is recorded in T₁ (28.55cm) whereas number of leaves is measure maximum in T₇ (102.56) and minimum no. Of leaves is measured in T₃ (54.54). The maximum number of branches were counted in T₇ (8.34) whereas minimum number of branch was counted in T₈ (2.12). The maximum number of flower is recorded maximum in T₇ (40.04) whereas the minimum number of flower is recorded in T₃ (31.97). Fruit length were observed in various patterns were length seems to be perfect result. The maximum number of fruit length (7.00 cm) was produced by T₇ where T₃ was recorded as the minimum produced of fruit length (6.56 cm). Number Of fruit count maximum T₇ (22.34) was recorded and minimum was count on T₃ the (16.47) maximum fruit weight was counted T₇ (3.23) whereas minimum was fruits weight was counted T₈ (2.12) maximum fruits yield per plant T₇ (132.46) whereas minimum on T₁ (122.26) maximum seed germination on T₇ (68.31) whereas minimum on T₈ (58.52). The size and weight of fruit is also important aspect as these character are useful for yield as well as consumer acceptability. The size of fruit was significantly increase by growth regulator. From all the treatment applied on the growth and yield of chilli highest yield was recorded T₇ (35.76 t/ha) where production seems to be higher, where was minimum was recorded T₃ (24.54) it revealed that application of different types of mulch I.e paper mulch, leaf mulch, jute mulch, straw mulch, white plastic mulch, grass mulch, black plastic mulch, no mulch on chilli was found to be statistically significant.

The reasons behind such type of results may be that the use of different types of mulch. However, T₇ was observed significant where evaluation in different locations and different planting times of the year and under different kinds of protected structures is recommended for validation of results.

Keywords: Mulch, growth, yield, *Capsicum annuum*

Introduction

Chilli (*Capsicum annuum* L.) belongs to family Solanaceae having chromosome number (2n=24), it is a self-pollinated crop. Chilli is an important spice and cash crop in many country of the world. It is origin in Mexico. It is most grown in the tropical and sub-tropical of world as an important vegetable and condiment crop. The fruits are good source of vitamin A (32%), ascorbic acid (26.67mg) and water (93.25mg) deficit often limits the crop growth and development as it is sensitive to water stress.

In India the exportable surplus from annual production is only about 5%, in china it is 30%. chillies crops in India occupies an area of 0.759 M. Mdhya Pradesh 54.41 ha produce 93.57 tonne, Rajasthan 12.21 ha produce 17.71 tonne, Utter Pradesh 13.47 ha produce 10.30 tonne, Gujarat 43.40 ha produce 68.43 tonne. Singh *et al.* (2008) [5].

The origin of chillies is believed to be as old as 7000 B.C. used in Mexico. Chili were grown and cultivated from 3500 BC. Mexicans used it to spice up their food. Chili was brought to the rest of the world by Christopher Columbus who discovered America in 1493. Christopher had set from Spain to reach India to bring spices such as pepper back to his country.

To improve the productive of crops where either particularly non-irrigation rain fed condition, proper moisture management of the soil is necessary mulching is an efficient method to conserve soil moisture, inhibits weed growth, inhibit weed growth maintain soil moisture, repels insect and reflect back selective light wave length and increase yield . M *et al.* (2011)

Mulches are used for the moderation of soil temperature, through the effects where highly variable. Colour of mulch affected soil temperature. White reflective plastic decrease temperatures. Hot day soil, temperature under straw mulch was reduced as much as 17 °C lower than un-mulched. Mulches of plant material like straw dry grass and leaves etc. reduce the soil temperature. Black polyethylene induces soil temperature, more moisture conservation higher soil microbial activity resulting in more mineralization and availability of nutrients to the plant. Senkho *et al.* (2007).

Material and Method

The experiment was carried out in a Randomized Block Design (RBD) from Feb 2022 to June 2022 at the Horticulture Farm of Rama University, Mandhana Kanpur, India. The test crop was chilli (Pusa jwala)

Pusha jwala variety of chilly will be cultivated for the study during the season of March to July 2022 in Randomized block Define with eight treatment and two replications .The treatments, were T₁ (paper mulch), T₂ (leaf mulch), T₃ (jute mulch), T₄ (straw mulch), T₅ (white plastic mulch), T₆ (grass mulch), T₇ (black plastic mulch), T₈ (No mulch)

The collected data were entered in Excel and analyzed statistically by F-test to examine the treatment effects and the mean differences were judged by Duncan’s Multiple Range Test (DMRT).

Results and Discussion

a. Number of Flowers per plant

Total number of flowers, data were taken according to the 60 days of interval up to 90 days of harvesting period where treatment of different types of mulch was seen maximum on T₇ (Black plastic mulch) highest was recorded (39.58) and the minimum was recorded as T₁ (paper mulch) was seems to be lowest resulting (31.84).

Table 1: No of flower per plant

Treatment	Treatments detail	No of flower	
		60 DAT	90 DAT
T ₁	Paper mulch	31.84	34.71
T ₂	Leaf mulch	33.17	34.87
T ₃	Jute mulch	31.97	36.25
T ₄	Straw mulch	34.26	36.67
T ₅	White plastic mulch	34.64	37.2
T ₆	Grass mulch	36.74	37.94
T ₇	Black plastic mulch	39.58	40.04
T ₈	No mulch	32.37	34.62
	CD	2.123	2.247
	SeM	0.156348	0.325176

b. Fruit’s weight (gm)

The fruits weight, data were taken after matured 120 days at harvesting period where treatment of different types of mulch was seen maximum on T₇ (Black plastic mulch) highest was recorded (3.23) and the minimum was recorded as T₈ (no mulch) as seems to be lowest resulting (2.12).

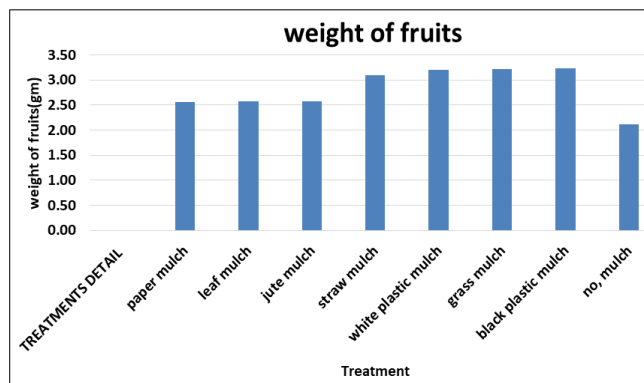


Fig 1: Fruit weight

c. Numbers of fruits per plant

The total number of fruit counted from the period of production it seems that plant was seen maximum on T₇ (Black plastic mulch) highest was recorded (22.43) and the minimum was recorded as T₃ (jute mulch) where seems to be lowest resulting (16.47).

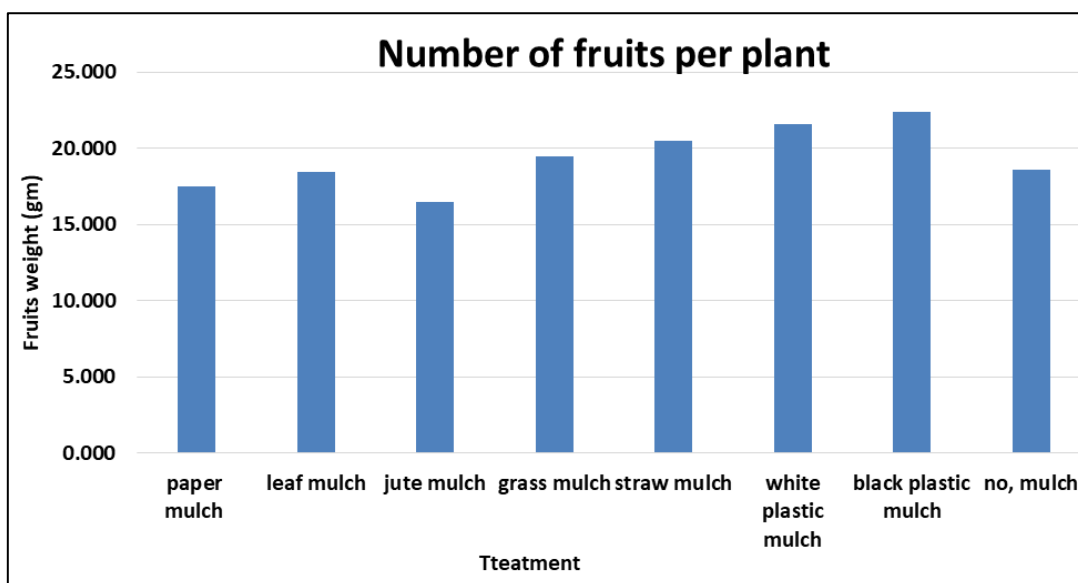


Fig 2: No of flowers per plant

Yield (t/ha)

Over all data shows that yield were observed quiet similar in every treatment, Thus the total yield, data where treatment of different types of mulch was seen maximum on T₇ (Black plastic mulch) highest was recorded (35.76) and the minimum was recorded as T₃ (jute mulch) was seems to be lowest resulting (24.54).

Table 2: Total yields (t/ha)

Treatment	Treatments detail	Yield (t/ha)
T1	Paper mulch	25.504
T2	Leaf mulch	26.543
T3	Jute mulch	24.543
T4	Straw mulch	28.876
T5	White plastic mulch	30.342
T6	Grass mulch	31.874
T7	Black plastic mulch	35.764
T8	No mulch	29.852
	CD	1.102
	SeM	0.102

Conclusion

The use of different black plastic mulch result in increased of growth and yield of chilli. The black plastic mulch gives positive effect on flower and fruit set. Use of black plastic mulch result best in all the parameters for the variety of chilli in Kanpur area of India is growing the chilli. For the commercial cultivation of the chilli variety pusa jwala, the use of black plastic mulch is more suitable.

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