



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2019; SPI: 241-243

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(Special Issue- 1)  
**2<sup>nd</sup> International Conference**  
**“Food Security, Nutrition and Sustainable Agriculture -  
Emerging Technologies”**  
(February 14-16, 2019)

**Effect of different types of Mulches on yield  
contributing characters and yield of Okra  
(*Abelmoschus esculentus*)**

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**Abstract**

The experiment was carried out at village Churi Wala Dhana in the field of Mr. Dalip Kumar during April-July 2018 to study effect of different types of mulches on yield contributing characters and yield of okra. The different mulches Paddy Straw Mulch, Black Mulch, White Mulch, Control (without mulching) were used in this experiment. The effect of different mulches on plant height, average fruit length, average fruit weight and yield per plot was observed. Out of these four treatments paddy straw shows best result as compare to other treatments. The result obtained that Plant height was maximum (56.80cm) observed in paddy straw mulch followed by control (55.48cm), white plastic mulch (55.22cm) and minimum (52.36 cm) in black polythene mulch. Maximum average fruit weight (9.22g) and fruit length (9.00cm) were also observed in paddy straw mulch. The maximum total fruit yield of okra per plot was obtained in paddy straw mulch (19.21 kg/plot) and least in (16.82 kg/plot) in black polythene mulch. Controlled treatment gave second best result. The least results were obtained from black plastic mulch.

**Keywords:** Mulches, contributing characters, *Abelmoschus esculentus*

**Introduction**

Okra (*Abelmoschus esculentus* L.) is an important vegetable grown for its green tender fruits which are used as a vegetable in a variety of ways. It is rich in vitamins, calcium, potassium and other minerals matter. It can be fried and cooked with necessary ingredients. The tender fruit can be cut into small pieces, boiled and served with soup. Matured fruit and stems containing crude fiber are used in the paper industry ([www.agrihunt.com](http://www.agrihunt.com))<sup>[1]</sup>.

A major constraint in the production of vegetables in the tropics is heavy infestation of weeds. The extent of damage due to weeds varies with the crop and the nature of weeds. In vegetables a yield loss of 70 to 80 per cent due to weeds. However, if weeding is not done at the proper time, growth and yield of crops will be affected seriously. Chemical weed control is a cost effective option to manage this situation. However, depending only on chemicals for weed management is not advisable, considering the ill effects of continued use of chemicals. Mulching is a non chemical method of covering the land surface with organic or inorganic materials. Mulches can lower the germination and development of weed seeds through mechanical and allelopathic effects. It will also help to moderate microclimate, maintain moisture content in soil through reduced evaporation rate, sustain the activity of microorganisms and accelerate nutrient transformations in soil. Mulching is an important activity in most vegetables grown in Kerala. Often, materials such as straw, grasses, green leaves, crop residues, sand and stones, and plastics are used as mulches. Several workers have reported that most of the mulches, whether organic or synthetic, are helpful in controlling weed population. Organic mulches proved to be better when compared to plastic mulches, because in the case of plastics, the cost of production is high and disposal of plastic debris after cropping is difficult. Organic mulches will also contribute to the nutrient status of soil upon its decomposition.

Mulches not only affect the soil environment they also change the plants environment

depending on the properties of the mulches and the level of the physical contact between the mulch materials and the soil. The uses of sawdust, polythene, straw mulches for dry season vegetables production in the research farm, increase the soil temperature, conserves soil moisture. In this manner it plays a positive role in the water conservation. The objective of the research work is to determine the effects of different mulching materials on the growth of okra (Dalorima *et al.* 2014) [2].

## Material and Methods

### Site

The experiment was carried out at village Churi Wala Dhana in the field of Mr. Dalip Kumar during April-July 2018.

### Area of experiment

An experiment was conducted in four different plots with each plot having dimensions of 5 × 2.25 m.

### Treatments

T1	-	Paddy Straw Mulch
T2	-	Black Mulch
T3	-	White Mulch
T4	-	Control

### Observations recorded

**Plant height (cm):** The height of five plants from each plot selected randomly were measured with the help of measuring tape from soil surface to the highest leaf of the plant at interval of 15 days.

**Fruit length (cm):** Five plants were selected randomly from each plot and fruit length of each fruit from selected plants was measured with the help of ruler.

**Fruit weight (g):** Five plants were selected randomly from each plot. Then weight of each fruit was measured with the help of weighing balance. After that the average fruit weight was used for further calculations.

**Yield:** Fruit yield of okra was calculated with the help of weighing machine by following procedure

- Firstly, yield from each plot was calculated at every eight pickings.
- Then, this calculated yield from each plot at every picking was added to find total yield of okra.

## Result and Discussion

### Plant Height

The maximum plant height was observed in paddy straw mulch (56.80cm) followed by control, white mulch and black plastic mulch (55.48, 55.22 and 52.36 cm).

(Bhutia *et al.*) [3] Carried out an experiment to determine the effect of mulching and nitrogen on growth yield and economics of okra. The maximum plant height (105.28cm) was recorded with black plastic mulch followed by green plastic mulch (92.15cm) and organic mulch (89.02cm) at harvest. (Rahman *et al.*) [4] carried out an experiment to determine the effect of different mulching materials on growth and yield of tomato. Plant height of tomato varied significantly at 15, 30 and 45 days after transplanting (DAT) due to use of different mulch materials. The maximum plant height at 15 DAT (28.45 cm), 30 DAT (55.99 cm) and 45 DAT (72.30 cm) was recorded from M1 treatment (black polyethylene), while the minimum plant height at 15 DAT (25.47 cm), 30 DAT (51.28 cm) and 45 DAT (66.62 cm) was recorded from M0 treatment (control).

### Average fruit Length

The maximum average fruit length was observed in paddy straw mulch (9.00cm) followed by controlled treatment (8.74cm), white mulch (8.14cm) and black mulch (8.10cm).

(Agyare *et al.*) [5] conducted a field study to evaluate the growth and fruit yield of okra as influenced by genotype and mulch. The experiment was carried out to assess the suitability of different mulch materials in enhancing the growth and fruit yield of okra. Three treatments of mulch (black plastic, grass, and no mulch) represented the main plots. Fruit length was influenced by mulching with black plastic (12.90cm) or grass (12.41cm) which significantly differed from no mulching.

(Mutetwa and Mtaita) [6] carried out an experiment at Africa University Farm (AU) in Mutare, Zimbabwe. The mulch color effect on the size of the fruits was significant. Fruit diameter was in the range of 4.4 to 4.8 cm and fruit length was in the range of 13.5 to 15.5 cm. Fruits from plots treated with Silvery-grey colored mulch were the biggest (diameter of 4.8 cm and length 15.5 cm compared to the rest of the colored mulches. Fruits from plots treated with Blue, Red and Yellow colored mulches were the smallest both in diameter and in length. Mean diameter and length for the cucumber fruits was 4.55 cm and 14.33 cm respectively.

### Average fruit weight

It was observed that maximum fruit weight was observed in paddy straw mulch (9,22gm) followed by controlled treatment (8.89gm), black plastic mulch (8.60gm) and white mulch (8.49gm).

(Nikolic *et al.*) [7] conducted an experiment to mulching methods and their effect on the yield of tomato. Wheat straw and wood sawdust and black and red coloured plastic foils were used for land mulching. The control was soil without mulch material. The experiment was set up according to the block system in four replications. We hypothesized that tomatoes grown with different mulch materials should show differences in height, weight, shape, number of fruits and yield when compared with tomatoes cultivated on soil without mulching. Application of the red foil resulted in the best vegetative growth of plants, and the greatest number, weight and size of fruits, as well as the highest total yield. The highest fruit weight per plant was obtained on the red foil (3.545 g), than on straw (2.530 g), sawdust (2.516 g) and the control (2.470 g).

(Abu-Goukh and El-Balla) [8] conducted an experiment to study the use of plastic mulches for better performance and yield of okra. The treatments were black mulch, clear mulch, green mulch, weeded control and unweeded control. The maximum average pod weight was observed in the black mulch (6.91g) followed by green mulch, clear mulch, weeded control (6.60g, 6.49g and 6.21g respectively). Minimum average pod weight was obtained from the unweeded control treatment (6.08g).

### Yield per plot

The maximum yield per plot was obtained from paddy straw mulch (19.21 kg/plot) followed by controlled treatment (19.17 kg/plot), white mulch (18.37 kg/plot) and black mulch (16.82 kg/plot).

(Olabode *et al.*) [9] observed that in okra, highest fruit yield of 12,135 kg/ha was obtained under plastic mulch, which resulted in significantly higher yield as compared to all other

treatments. Yields from grass mulch (6,703 kg/ha) were similar to that of the hand weeding control (6,976 kg/ha). However, these were significantly higher than those of wood shaving mulch (5,301 kg/ha). Yield from the weedy control was found to be the lowest (946 kg/ha; 14 g/plant).

(Rajablariani and Rafezi) <sup>[10]</sup> carried out an experiment that tomato was grown on polythene mulch films and bare soil for evaluate the effect of weed and crop yield. The treatments were clear mulch, black mulch, red mulch, blue mulch, silver/black mulch and bare soil. Plants grown under clear mulch had the highest early yield (1820 kg/ha) followed by blue, red, bare soil, weedy, silver/black and least yield was

obtained from the black mulch.

## Observations and Tables

**Table 1:** Effect of different types of Mulches on yield contributing characters and yield of Okra on Plant Height

Treatments	Days after sowing				
	15 DAS	30 DAS	45 DAS	60 DAS	75 DAS
T1	4.76	15.08	28.58	39.14	56.80
T2	3.64	12.44	27.42	35.86	52.36
T3	3.68	13.4	29.04	37.20	55.22
T4	4.54	13.08	28.38	37.90	55.48

**Table 2:** Effect of different types of Mulches on yield contributing characters and yield of Okra on Average fruit length

Treatments	Fruit length (in cm)								
	1 <sup>st</sup> picking	2 <sup>nd</sup> picking	3 <sup>rd</sup> picking	4 <sup>th</sup> picking	5 <sup>th</sup> picking	6 <sup>th</sup> picking	7 <sup>th</sup> picking	8 <sup>th</sup> picking	Avg. length
T1	6.79	7.59	8.26	7.95	9.63	9.43	11.43	10.91	9.00
T2	5.86	7.14	7.95	7.43	8.65	9.01	9.35	9.68	8.10
T3	6.34	5.45	8.21	8.25	9.28	8.99	9.23	9.41	8.14
T4	5.44	7.34	8.30	8.57	9.34	9.29	11.21	10.43	8.74

**Table 3:** Effect of different types of Mulches on yield contributing characters and yield of Okra on Average fruit weight

Treatments	Fruit weight (in gm)								
	1 <sup>st</sup> picking	2 <sup>nd</sup> picking	3 <sup>rd</sup> picking	4 <sup>th</sup> picking	5 <sup>th</sup> picking	6 <sup>th</sup> picking	7 <sup>th</sup> picking	8 <sup>th</sup> picking	Avg. weight
T1	5.29	6.05	9.15	10.35	12.34	9.89	9.71	10.34	9.22
T2	5.44	5.00	6.59	10.8	11.00	10.27	10.32	9.42	8.60
T3	5.11	5.65	6.35	10.42	10.97	9.958	9.27	10.21	8.49
T4	4.82	5.09	7.02	10.99	11.97	10.84	10.30	10.08	8.89

**Table 4:** Effect of different types of Mulches on yield contributing characters and yield of Okra on Yield per plot

Treatments	Yield per plot (in kg)								
	1 <sup>st</sup> picking	2 <sup>nd</sup> picking	3 <sup>rd</sup> picking	4 <sup>th</sup> picking	5 <sup>th</sup> picking	6 <sup>th</sup> picking	7 <sup>th</sup> picking	8 <sup>th</sup> picking	Total yield
T1	1.94	2.14	2.31	2.80	2.11	2.73	2.91	2.24	19.21
T2	1.34	1.50	1.63	1.80	2.26	2.80	2.63	2.96	16.92
T3	1.64	1.46	1.48	1.67	3.22	2.90	2.87	3.13	18.37
T4	2.10	1.90	2.21	2.53	2.92	2.5	2.41	2.60	19.17

## Conclusion

The research was carried out to evaluate the effect of different mulching material on growth and yield of okra. The conclusion was obtained that the yield and numbers of pods significantly increased in straw mulch. Plant height was maximum (56.80cm) observed in paddy straw mulch followed by control (55.48cm), white plastic mulch(55.22cm) and minimum (52.36 cm) in black polythene mulch. Maximum average fruit weight (9.22g) and fruit length (9.00cm) were also observed in paddy straw mulch. The maximum total fruit yield of okra per plot was obtained in paddy straw mulch (19.21 kg/plot) and least in (16.82 kg/plot) in black polythene mulch. Controlled treatment gave second best result. The least results were obtained from black plastic mulch.

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