

Short Communication

Effect of FYM and black plastic mulching in sponge gourd (*Luffa cylindrica* L.)

AC Mishra* and SV Dwivedi

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By virtue of small crop duration, cucurbits like sponge gourd, pumpkin, cucumber, bitter gourd and bottle gourd as well as many other vegetable crops like cowpea, okra, brinjal, tomato, root and leafy crops are gaining popularity as cash crop in Bundelkhand region of Uttar Pradesh. The sponge gourd (*Luffa cylindrica* L.) is an important crop of this region grown twice in a year *e.g.* during summer and rainy seasons. For summer crop, early sowing *i.e.* in the month of January is practiced avoiding exposure of crop to excessive day temperature (45 °C or above) and acute water scarcity. With certain management practices like trailing the vines on trellis and proper weed management, rainy season crop can be grown successfully with comparatively higher yield. In addition to high infestation of weeds in rainy season crop, compaction of rhizospheric soil due to heavy rains is another problem which results in poor growth and yellowing of vines. Low soil organic matter is inherent problem of invariably all the districts of Bundelkhand region and high clay accompanied with low organic content collectively lead to compactness in soil. The rhizospheric soil may be kept reasonably perforated by application of sufficient quantity of manures and seed sowing on ridges. Another important practice which not only keeps rhizospheric soil perforated but also conserves/maintains soil moisture at optimum level, checks weed growth, improves the population of beneficial soil microbes and ultimately increases yield is mulching (AVRDC 1990). The beneficial effects of mulches have also been speculated by Struzina and Kromer (1989) in cucumber, Khan et al. (2015) in sponge gourd, Mishra (2017) in marrow and Singh and Aulakh (2018) in bitter gourd. Present investigation has been carried out with the aims to assess the effect of optimum level of farm

yard manure accompanied with black plastic mulching on yield of sponge gourd.

The field experiments for present investigation were conducted in vegetable research farm of Banda University of Agriculture and Technology, Banda (latitude between 24° 53'2" and 25° 55'2" N and longitude 80° 07'2" and 81° 34'2" E) during summer-rainy season (June to September) of 2018 and spring-summer (February-June) of 2019. The experiments were laid out in randomized block design with five replications. The treatments included application of two levels of FYM (7.5 t/ha and 15 t/ha) with and without black plastic mulching (200µ) in sponge gourd genotype BUAT SG18-1 (IC0628847). The details of treatments were as T₁: FYM @7.5t/ha, T₂: FYM @15t/ha, T₃: FYM @7.5t/ha + black plastic mulching and T₄: FYM @15t/ha + black plastic mulching. The experimental crops were raised at 1.5m x 0.75m spacing in the plots of 4.5m x 3.75m size.

The summer-rainy crop was raised by direct sowing seeds on ridges whereas that in spring-summer was raised by sowing of seeds in flat beds. The specified dose of FYM and NPK @ 80:60:40 kg/ha were mixed in soil during last ploughing. The data were recorded on number of fruits/plants, average fruit weight (g), average fruit length (cm) and fruit yield (q/ha). The economics (B/C ratio) of each treatment was worked out on the basis of cost of cultivation (Rs./ha), yield data and selling market rate of produce.

Results indicated that there was significant effect of both manure levels and black plastic mulch on fruit yield and yield contributing characters in sponge gourd (Table 1). Maximum fruit yield was found in treatment containing FYM @15t/ha + black plastic mulching (T₄) during both summer-rainy (458.00 q/ha) and spring-summer (and 223.9 q/ha) seasons with average of 340.95 q/ha. In this treatment, similar trend was also noted for fruit length (42.3 cm and 33.4 cm, respectively), number of fruits

per plant (39.7 and 20.4) and average fruit weight (129.8 g and 126.5 g, respectively). Second most important treatment was T_3 i.e. FYM @7.5t/ha + black plastic mulching which also registered higher average values for fruit yield (251.67 q/ha), fruit length (32.55 cm), number of fruits per plant (23.25) and average fruit weight (121.20 g). Plants under high FYM level and black plastic mulch produced higher fruit yield because of longer, bulky and more number of fruits per plant in this treatment. As a matter of fact, crop in treatment consisting of equal quantity of FYM (15 t/ha) without black plastic mulching (T_2) exhibited reasonably poor yield e.g. 203.65 q/ha in summer-rainy crop and 90.6 q/ha in spring-summer crop, the average being 147.13 q/ha even less than that having half of the level of FYM (7.5 t/ha) but black plastic mulch (T_3) (346.63 q/ha in summer-rainy crop and 156.7 q/ha in spring-summer crop). This indicated that high FYM level could not crack the nut alone rather than weed free and favourable hydrothermal edaphic environment created by black plastic mulch around rhizosphere enabled plant roots to utilize nutrients released from FYM leading to luxuriant plant growth and heavy bearing. Corresponding to the findings of present investigation, by use of black plastic mulching better performance has also been realized by Sylvestre et al. (2014) in water melon, Khan et al. (2015) in sponge gourd, Ahmad et al. (2017) in bottle gourd, Singh and Aulakh (2018) in bitter gourd under tropical or sub-tropical conditions. However, in a study Mishra (2017) and Mishra (2018) realized better effect of straw and white plastic mulches over black plastic mulch in marrow and brinjal, respectively under temperate Himalayan climates.

It is evident from the tables 1 that the treatment consisting 15 t/ha level of FYM and mulching with black plastic sheets (T_4) involved slightly higher cost of cultivation (Rs. 83500/ha during summer-rainy and 76150/ha during spring-summer) but due to considerable increase in yield highest cost/benefit ratio was realized in both seasons viz., 5.5 and 4.4, respectively. It was also obvious that black plastic mulching even after curtailing half dose of FYM i.e. @ 7.5 t/ha as in T_3 lead to slight decline in cost of cultivation (Rs.75450/ha and Rs.68650/ha) but sustained fruit yield of 346.63 q/ha in summer-rainy and 156.70 q/ha in spring-summer crops was realized with B/C ratio of 4.6 and 3.4, respectively. Contrarily, equal dose of FYM without application of black plastic mulch i.e. 7.5 q/ha in T_1 and 15 q/ha in T_2 exhibited disappointing results on fruit yield (average 79.85 q/ha and 147.13 q/ha, respectively), fruit length (average 23.05 cm and 24.08 cm, respectively), average fruit weight (average 85.5g and 96.95 g, respectively), number of fruits per plant (average 10.6 and 17.5,

Table 1: Effect of FYM and black plastic mulching in sponge gourd during summer-rainy and spring summer seasons

Treatments	Number of Fruits/Plant		Average Fruit Weight (g)		Average Fruit Length (cm)		Fruit Yield (q/ha)		Cost of Cultivation (Rs./ha)		B/C Ratio				
	Summer-rainy 2018	Spring-summer 2019	Summer-rainy 2018	Spring-summer 2019	Summer-rainy 2018	Spring-summer 2019	Summer-rainy 2018	Spring-summer 2019	Summer-rainy 2018	Spring-summer 2019	Summer-rainy 2018	Spring-summer 2019			
T_1 : FYM @7.5t/ha	15.0	6.3	86.4	84.6	24.5	21.6	23.05	115.2	44.5	79.85	45,450	38,650	2.6	1.7	2.15
T_2 : FYM @15t/ha	23.5	10.8	97.5	96.4	26.4	23.2	24.08	203.65	90.6	147.13	53,500	46,150	3.8	2.9	3.35
T_3 : FYM @7.5t/ha + BPM	31.3	15.2	124.6	117.8	35.5	29.6	32.55	346.63	156.7	251.67	75,450	68,650	4.6	3.4	4.00
T_4 : FYM @15t/ha + BPM	39.7	20.4	129.8	126.5	42.3	33.4	37.85	458	223.9	340.95	83,500	76,150	5.5	4.4	4.95
CV (%)	12.2	11.3	14.7	13.2	15.6	12.7	14.15	17.8	14.8	16.3	-	-	-	-	-
CD(0.05)	4.2	3.6	11.6	9.8	3.5	4.7	4.1	83.4	67.5	75.45	-	-	-	-	-

BPM: Black Plastic Mulching; Note: Produce sold @ Rs.1000/q during summer-rainy, 2018 and @ Rs.1500/q during spring-summer, 2019

respectively) and B/C ratio (average 2.15 and 3.35, respectively).

On the basis of above interpretations, it could be concluded that cultivation of sponge gourd with application of FYM @ 15t/ha along with ridge or beds covered with black plastic mulch is remunerative technology for summer-rainy as well as spring-summer seasons in Bundelkhand region of Uttar Pradesh. Higher level of FYM alone was not found so effective as with black plastic mulching.

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