

Effect of Paddy Husk used as Mulch on Cauliflower under Two Intervals of Irrigation and Two Levels of Nitrogen*

by

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Introduction: The inter-relationship of water supply to mulch has been a point of study as it affects the water requirements of the crop. The use of different types of dead vegetable material as mulch has been advocated depending upon the availability of materials, environment, cultural practices and plant types. In Madhya Pradesh, paddy husk is available in plenty and it has no use except as a fuel in some small scale industries. Its use as mulch in vegetables specially cole crops may be of use in economising irrigation and increasing yields.

An experiment was laid out to study the effect of paddy husk as a mulch with two intervals of irrigation and two levels of nitrogen on the cauliflower crop at Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur Farm (Madhya Pradesh).

Materials and Methods: The soils are light sandy loam locally known as 'Sehara' soil. The experiment was laid out in the form of split plot design with two intervals of irrigation (15 and 35 days) with and without mulching as main plot treatments and two levels of nitrogen (25 kg and 50 kg N per acre) as sub-plot treatments.

Seedlings were transplanted on 15th November 1964. Paddy husk was spread in plots covering the entire surface to a uniform thickness of 4 inches, 24 days after transplanting. Irrigations were given as per treatments.

Results and Discussion: Observations on the height of plant, stem girth, average number of leaves, leaf area, yield and weed population were recorded. Soil moisture, available nitrogen, phosphorous and potash were estimated during the different stages of growth.

Mulch had its effect on the height and size of the leaves. The height was significantly increased by mulching as compared to no mulching. The girth of the stem and number of leaves were slightly reduced due to mulching, but the differences were non-significant.

Mulching resulted in significantly more weight per head as compared to unmulched plants.

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TABLE 1. Mean data on growth at 36 days after mulching, yield of cauliflower heads and mean weed population (per sq. ft.)

Characters	Mulch		Irrigation interval		S. Em.		C.D. at 5%		Irrigation interval		S. Em.		C.D. at 5%		No mulch	
	No mulch	Mulch	15 days	35 days	0.50	1.32	1.60	21.98	20.95	0.50	1.32	1.60	21.98	20.95	0.50	1.60
Height (cm)	20.56	22.33	0.50	21.98	20.95	0.50	N.S.	19.95	22.93	0.41	1.26	19.95	22.93	0.41	1.26	20.56
Girth (cm)	2.29	2.45	0.50	2.39	2.34	0.05	N.S.	2.35	2.39	0.63	N.S.	2.35	2.39	0.63	N.S.	2.29
Number of leaves per plant	22.31	22.16	0.83	22.59	21.89	0.83	N.S.	21.70	22.64	0.75	N.S.	21.70	22.64	0.75	N.S.	22.31
Length of leaves (cm)	26.92	29.30	1.32	27.77	28.45	1.32	N.S.	26.17	30.05	0.88	2.70	26.17	30.05	0.88	2.70	26.92
Breadth of leaves (cm)	14.52	16.23	0.66	14.77	15.98	0.66	N.S.	15.15	15.59	0.43	N.S.	15.15	15.59	0.43	N.S.	14.52
Leaf area (sq cm)	4208.8	4362.20	140.11	4450.40	4117.60	140.11	N.S.	4030.50	4531.20	68.09	209.89	4030.50	4531.20	68.09	209.89	4208.8
Mean wt/head (g)	659.59	798.68	39.36	759.10	711.66	39.39	N.S.	651.59	806.79	32.26	99.45	651.59	806.79	32.26	99.45	659.59
Diameter/head (cm)	12.17	12.79	0.30	12.68	12.30	0.30	N.S.	12.03	12.92	0.25	0.76	12.03	12.92	0.25	0.76	12.17
Yield/plot (186 kg/sq. ft.)	13.26	15.13	0.76	14.51	13.88	0.75	N.S.	12.51	17.14	0.67	2.08	12.51	17.14	0.67	2.08	13.26
Mean weed population (per sq. ft.)	27.16	1.08	0.93	16.84	11.70	0.93	2.98	14.37	13.87	0.77	N.S.	14.37	13.87	0.77	N.S.	27.16

Similar results have been obtained by Bielka (1960) who reported that covering the soil gradually with organic mulches increased the yield of 18 vegetable crops by an average of 27%. Carolus (1959) also reported that mulching on melons and summer squashes increased the yield.

The irrigation interval did not bring out significant differences in any of the growth characters and yields.

The application of 50 kg N per acre significantly increased the height, length of leaves and leaf area. Girth and breadth of leaves were also greater over 25 kg N per acre. The application of high dose of nitrogen has significantly increased the weight per head, yield per plot and diameter of head over the lower dose. Fisher *et al* (1959) have also reported that nitrogen application increased the yield and decreased the soluble solids.

The better growth of mulch might have been due to increase in the availability of more nutrients resulting in the better growth and size of the leaves. The better growth in the earlier stages and more leaf area with mulch ultimately resulted more yield of heads on account of better moisture supply.

The data on weed population indicate that mulching smothers the weeds resulting in lesser number of weeds in mulched plots and a larger number of weeds in unmulched plots. The shorter interval of irrigation resulted in more number of weeds than the longer interval of irrigation. Cox and Auster (1963) also observed the suppressing effects of mulches on weed population. The population of weeds due to mulching was reduced as their germination and growth might have been checked by 4 inch thick mulch spread, which might have checked light and air to the germinating weeds. Nitrogen levels did not affect weed population significantly.

The data on the available N, P, K in soil in lb per acre after harvest have been summarised in Table 2.

TABLE 2. *Chemical contents of the soil after harvest in lb / acre*

Treatments	N	P	R
No mulch	155.0	34.8	210.5
Paddy husk	197.5	42.5	240.0
Irrigation interval at 15 days	167.5	37.9	215.0
Irrigation interval at 35 days	185.0	39.4	235.5
Nitrogen 25 kg / acre	167.5	32.5	227.5
Nitrogen 50 kg / acre	185.0	44.8	233.0

Mulching with husk, longer interval of irrigation and higher levels of nitrogen increased the quantity of available nitrogen, phosphorous and potash

(Table 2). Similar results were obtained by Jyotishi and Bhalla (1967) in cauliflower.

Soil under mulched plots and at higher level of nitrogen conserved more moisture. As is expected soil under shorter interval of irrigation conserved more moisture *vide* (table 3).

TABLE 3. *Moisture percentage in soil one day before irrigation*

Treatments	Irrigation at 15 days intervals	Irrigation at 35 days intervals
No mulch	12.61	9.80
Mulch	15.07	12.52
25 kg N	13.30	10.80
50 kg N	14.38	11.52

Summary and Conclusion: Four inch thick mulching with paddy husk has been found to be beneficial in increasing the growth and yield of cauliflower over 'no mulch'. The two intervals of irrigations did not show significant differences in yield but mulching with longer interval of irrigation was found to be as good as mulching with shorter interval of irrigation. Thus mulching can definitely save the cost of irrigation.

Higher levels of nitrogen significantly gave much more yield over low dose of nitrogen. This indicates the advantage of the use of higher level of nitrogen to the cauliflower crop.

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