

Effect of Mulching on Growth and Yield of Pumpkin (*Cucurbita pepo*) in the Semi Arid Region of Borno State, Nigeria

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Mulching has been used to improve yield in tomato (Quinn 1975) through its marked effect on the soil environment (Lal *et al.* 1989). This study investigates the effect of different mulches on the growth and fruit yield of pumpkin, under the prevailing semi-arid condition of Borno state, Nigeria, where it is commonly and extensively cultivated during rainy season and efforts are being made to cultivate in dry season also.

Two field trials were conducted on sandy loam soil (Typic Ustipsamment) at Teaching and Research Farm, University of Maiduguri (11°4' N and 13°05'E) during dry season of 1989 and 1990. The annual rainfall is 550 to 647 mm, while temperature varies between 18° to 46°C. Practically, the rainfall period is three to four months (i.e. from June to September), while November to April is a dry period. A long dry season is followed by a single wet season.

Six pumpkin seedlings of 17 day old (cv. Round yellow) were transplanted at 3 m distance in 3 x 18 m plots. Four different types of mulches sawdust, groundnut shell, millet stover, and maize cob were laid on the plot and replicated three times in CRD. After transplanting, plots were irrigated by watering can to field capacity twice a week.

Soil temperature at 15 cm depth was measured at 06, 09, 12, 16 and 20h using a Weksler thermometer model MA-160 attached to soil probe (Drinjiff & Kerkahoyeng veng 1979). Weed intensity was evaluated by visual scoring.

Plant growth and fruit yield parameters were monitored by counting twice a month. Total length of stem and fruit crop harvest was measured at 95 days after transplanting (DAT).

Mulch treated plots had lower afternoon soil temperature than no mulch plots which might have

been achieved by the interception of the sun rays and hot dry air by the layer formed of mulches on the soil surface (Lal 1973) and has lower content coefficient.

Weeds were few in mulched plots than control. Moreover, weed growth was more effectively reduced by sawdust (Table 1) which possibly due to finer particles in saw dust having growth retardant effect thereby prevented weed germination and growth.

Plant growth and yield were significantly higher in mulched plots than non mulched (Table 1), which might be due to the availability of higher soil moisture (Lal 1973). The high soil temperature (37°C) in no mulch soil might have retarded root growth and consequently reduced uptake of moisture and dissolved nutrients. Number of branches, leaves, flowers and fruits were significantly higher in groundnut shell mulched plots compared to others.

The total fresh weight of marketable yield was significantly higher in mulched than that of no mulch plots because of higher soil moisture and relatively low temperature. The results are in accordance with the findings of Quinn (1975), Srivastava *et al.* (1981). Groundnut shell mulched increased marketable yield of pumpkin by 66%.

It is evidently clear from this study that the marketable yield of pumpkin increases by mulching, especially by the groundnut shell mulch. Besides this, irrigation water can also be economised, which in turn, will reduce irrigation water cost.

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Table 1 Effect of different mulches on soil temperature, growth and yield parameters of pumpkin

Characters	Mulch				
	No mulch	Saw dust	Groundnut shells	Millet stover	Maize cobs
Soil temperature ($^{\circ}$C) at 15 cm depth					
06h	22	20	20	20	20
09	28	25	21	22	23
12	37	31	26	28	28
16	35	28	23	24	24
20	20	22	21	21	21
Weed intensity (score)					
	3	1	2	2	2
growth parameters (Plant^{-1})					
No. of branches	3c	4b	6a	5a	4b
Total stem length (m)	12.6c	14.1b	17.3a	15.9ab	16.9a
Number of leaves	158d	170c	198a	188b	182b
Number of male flowers	68d	98c	135a	120bb	110b
Number of female flowers	20c	26c	50a	40b	32bc
Number of fruits	5c	6b	9a	8a	7ab
Fruit yield parameters					
Fresh weight fruit $^{-1}$	4.2c	5.0b	7.0a	6.0a	5.5b
Total fresh weight (kg plant^{-1})	21e	30d	63a	48b	38.5c
Increase in weight (kg)	—	9	42	27	17.5
Total fruit fresh weight ha^{-1} (t)	23,703c	34,074d	70,000a	53,333b	43,518c
Increase in weight (%)	—	30	66.6	55.5	45.5

Values are pooled means of 3 replications and of two years

Values with common letter in the same column do not differ significantly at 5% level according to DMRT. Weed intensity score as per Drinjiff and Kerkahoyeng (1979)

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(Received June 1992 Accepted January 1993)