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Effect of mulching on ginger (*Zingiber officinale* Rose) in the hilly region of Darjeeling district.

D. K. SENGUPTA , [1]T. K. MAITY AND B. DASGUPTA

All India Networking Project on Betel vine,
[1]Department of Vegetable Crops, Bidhan Chandra Krishi Viswavidyalaya,
Mohanpur 741252,Nadia, West-Bengal, India.

ABSTRACT

A field trial was conducted at the Horticultural Research Station, Bidhan Chandra Krishi Viswavidyalaya, Pedong, Darjeeling, West Bengal for two consecutive years to study the effect of mulching on growth and yield of ginger (Zingiber officinale Rose). The beds of ginger cv. gorubathan was covered with four different mulching materials viz. wheat straw, ulu-grass and dry leaves @ 5.0 tones per hectare and black polyethylene sheet @ 2.0 quintal per hectare immediately after planting of seed rhizomes, along with a control plot. Among the different mulching materials, dry leaves showed maximum height (78.05 cm), number of pseudostem per clump (4.26), leaves per clump (62.65) and highest yield (52.17 t/ha) with an increase in yield by 12.92 t/ha over control followed by wheat straw and ulu-grass.

Key Words: Mulching, rhizome and ginger

Ginger is a high value cash crop and requires lot of management practices for increasing its production and productivity. A good number of experiments have been conducted to increase the yield of ginger. Sengupta, Maity and Dasgupta (2008) have shown how to increase in rhizome yield in ginger using growth regulators, particularly in hilly region of Darjeeling district of West Bengal. Mulching is an important component in the management practices of ginger. Mulching the fields with green manure is the most important operations carried out for successful ginger production. In the dry months, it conserves the moisture in the soil and enhances soil temperature for proper germination of the rhizome. In addition, it checks weed growth and enriches the fertility of the soil after decomposition. Further it prevents washing out of soil and nutrients during heavy rains (Randhawa and Nandpuri, 1969 and Mohanty 1977). Mulching has been found to increase the yield of ginger (Acian and Inisumbing, 1976 and Mohanty and Sharma, 1978). Keeping in view of the above facts, the present investigation was undertaken to study the effect of different mulching materials on the growth and yield of ginger in the hilly regions of Darjeeling district, West Bengal, India.

MATERIALS AND METHODS

A field experiment was conducted in the Horticultural Research Station, BCKV, Pedong, Darjeeling, West Bengal for two consecutive years from March to November following RBD with five replications. The soil type of the plot was sandy loam with a pH ranging from 5.65 to 5.80, having organic carbon 1.45%, total nitrogen 0.158%, available phosphorus 11.50 kg/ha and available potash 75.00 kg/ha. The variety gorubathan was used as a planting material. The treatment comprising of wheat straw, ulu-grass, dry leaves @ 5 tonnes per hactare and black polyethylene sheet @ 2 quintal per hectare, were used immediately after planting the rhizomes in beds as mulching materials along with a control. Recommended cultural practices were followed to raise a successful crop. Growth and yield observations were recorded at the age of about 7 months. The data obtained were statistically analysed as per Panse and Sukhatme (1978).

RESULTS AND DISCUSSION

Height of the plant

The results presented in Table 1 clearly indicated that different mulching materials significantly influenced the plant height. The dry leaves and wheat straw showed better results than the others. However, both the treatments were at par with each other. The maximum plant height (78.05cm) was recorded in dry leaves followed by 74.07cm in wheat straw. The use of ulu-grass and black polyethylene as mulching materials also resulted in significant increase in plant height over control.

Number of pseudostems per clump

The number of pseudostems per clump responded significantly to different mulching materials. The use of wheat straw, black polyethylene and ulu grass responded almost equally to that of control and were at par (Table 1). The highest number of pseudostem (4.26 nos.) was obtained in dry leaves mulch which was significantly different from control as well as other treatments. The lowest number of pseudostem (3.58) were recorded in ulu grass.

Email: b_dasgupta25@yahoo.co.in

.**Number of leaves per clump**

Similar to that of plant height and pseudostem numbers, the number of leaves per clump was statistically significant in different treatments (Table1). The number of leaves produced in dry leaves and wheat straw mulch were 62.65 and 55.31, respectively. The results obtained with the use of ulu-grass and black polyethylene were of 50.95, and 51.56 number of leaves per clump, respectively.

Yield per plant

The results presented in Table1, clearly revealed that the yield per plant of ginger was significantly influenced by the use of different mulching materials. Dry leaves mulch produced pronounced effect with regard to plant yield against the other treatments in both the years. Use of black polyethylene was less effective towards increasing the yield of the crop. However, the maximum and minimum yield of 0.260 and 0.195 kg per plant were recorded from dry leaves and control, respectively.

Yield per hectare

Perusal of the data presented in Table1 revealed significant differences in yield by use of different mulching materials. The yield ranged between 39.25t/ha and 52.17t/ha. The yield recorded from dry leaves and wheat straw mulched crop were 52.17 and 49.30 tonnes per hectare, respectively followed by ulu grass (46.42t/ha) and black polythelene (41.05t/ha).

The increased growth as observed in the present investigation by the use of either dry leaves or wheat straw were due to uniform germination, conservation of soil moisture and better weed control as compared to other treatments. Groszmann (1954) reported uniform germination by mulching which corroborates with this findings. Also mulches facilitated in better mineralization and availability of nutrients in modifying the various yield attributes to the better advantage of rhizome yield (Minakshi, 1959). The reduced growth in black polyethylene mulch was also reported by Hussain *et al*., (1969) in turmeric as compared to organic mulch. It can be concluded that mulching with dry leaves and wheat straw can be successfully used for enhancing the growth and yield of ginger.

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Table 1: Effect of different mulching materials on growth and yield of ginger

Treatments	Plant height (cm)			No. of pseudostem/ clump			No. of leaves/clump			Yield/plant (kg)			Projected yield (t/ha)		
	1st year	2nd year	Mean	1st year	2nd year	Mean	1st year	2nd year	Mean	1st year	2nd year	Mean	1st year	2nd year	Mean
Wheat straw	70.99	77.16	74.07	3.68	4.20	3.94	52.98	57.64	55.31	0.244	0.249	0.246	48.80	49.80	49.30
Ulu-grass	72.24	70.73	71.48	3.59	3.57	3.58	49.54	52.36	50.95	0.234	0.230	0.232	46.85	46.00	46.42
Dry leaves	76.75	79.35	78.05	4.30	4.22	4.26	61.06	64.24	62.65	0.258	0.263	0.260	51.60	52.75	52.17
Black polyethylene	68.53	70.79	69.66	3.61	4.10	3.85	49.57	53.56	51.56	0.203	0.207	0.205	40.65	41.45	41.05
Control	65.71	63.56	64.63	3.65	3.69	3.67	44.92	42.03	43.47	0.201	0.190	0.195	40.35	38.15	39.25
S.Em (±)	**1.660**	**2.054**	**1.493**	**0.177**	**0.110**	**0.106**	**2.013**	**1.949**	**1.705**	**0.012**	**0.005**	**0.001**	**1.504**	**1.340**	**0.722**
LSD (0.05)	**5.114**	**6.328**	**4.600**	**NS**	**0.340**	**0.326**	**6.202**	**6.005**	**5.253**	**0.036**	**0.015**	**0.003**	**4.633**	**4.128**	**2.224**