

Mulch requirement of ginger (*Zingiber officinale* Rosc.) under shade

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Abstract

Field experiments conducted at Vellayani (Kerala, India) to study the mulch requirement of ginger (*Zingiber officinale*) under various shade levels indicated that under 25 per cent shade, one-fourth quantity (7.5 t/ha) of green leaf mulch could be saved.

Key words: ginger, mulch, shade, *Zingiber officinale*.

Mulching is one of the essential management practices for successful cultivation of ginger (*Zingiber officinale* Rosc.). The beneficial effect of green leaf mulch, in enhancing sprouting, controlling soil erosion, moisture conservation, addition of organic matter, reduction in soil temperature, improving soil physical properties and controlling weed growth is well known (Aiyadurai 1966; Jha *et al.* 1972; Aclan & Quisumbing 1976; Mohanty 1977). Experiments using artificial shade revealed the shade loving nature of the crop (Aclan & Quisumbing 1976; Jayachandran *et al.* 1991; KAU 1992; Ancy 1992). Since the existing recommendation of mulch (30 t/ha) is for open conditions it is logical to assume the possibility of reducing the quantity of mulch when ginger is grown under shaded situations. The scarcity of green leaf mulch due to deforestation and intensive cropping (Valsala *et al.* 1990) magnifies the necessity of reducing the

quantity of mulch used without sacrificing rhizome yield. The present investigation was therefore undertaken to explore the possibility of reducing the quantity of mulch when ginger is grown under shade.

The field experiment in a strip plot design with five replications was conducted at the College of Agriculture, Vellayani (Kerala, India) using cv. Rio-de-Janeiro. In the vertical strip plots (5 m x 1 m), the shade provided were : 0 (S₀), 25 (S₁), 50 (S₂) and 75 (S₃) per cent shade levels. In the horizontal strip plots (5 m x 1 m) the mulch used were : 25 (M₁), 50 (M₂), 75 (M₃) and 100 (M₄) per cent of the recommended dose namely, 30 t of green leaf mulch per hectare (KAU 1993). Artificial shade to the required levels was regulated by using high density polyethylene shade materials spread over *pandals* and calibrated with LI-COR LI-188 Quantum Radiometer with a photometric

sensor. Green leaves collected from mahogany (*Swietenia mahagoni*) were used for mulching. Half the quantity was applied immediately after planting, one-fourth 2 months after planting and remaining one-fourth 4 months after planting. All other cultural operations were carried out uniformly in all treatments as per the package of practices recommended by KAU (1993). The crop received a total of 1691 mm rainfall in 97 rainy days. The fortnightly mean temperatures near the crop canopy during the crop growth period at 13.30 h under open, 25, 50 and 75 per cent shade levels were 29.4, 28.5, 28.0 and 27.8°C, respectively. The fortnightly means of Relative Humidity at 13.30 h near crop canopy under open, 25, 50 and 75 per cent shade levels were 77.8, 80.3, 81.9 and 82.7%, respectively. The crop was harvested 8 months after planting and dry ginger yield was estimated.

The influence of mulch on dry ginger yield was significant and showed an increasing trend with increasing levels of mulch (Table 1). Significant mulch-

shade interaction was also observed. In general, under all shade levels, dry ginger yield showed an increasing trend with increasing levels of mulch. Maximum dry ginger yield (5256 kg/ha) was obtained from S_1M_4 which was closely followed by S_1M_3 (5246 kg/ha) and was statistically on par. This clearly indicated that under 25 per cent shade, the quantity of mulch could be limited to 75 per cent of the recommended dose. Thus under 25 per cent shade 22.5 t of green leaf mulch was sufficient and one-fourth quantity (7.5 t/ha) could be saved. Under open condition the existing rate of 30t/ha was found necessary and significant yield reduction was noticed when the quantity of mulch was reduced from 30 to 22.5t/ha. The maximum yield of 5256 kg/ha obtained from 25 per cent shade level was 36 per cent higher than that obtained under open condition conforming the earlier observations of shade loving nature of ginger (Aclan & Quisumbing 1976; Jayachandran *et al.* 1991; KAU 1992; Ancy 1992).

Table 1. Effect of mulch and shade levels on ginger yield

Shade level (%)	Mulch level (% recommended dose*)				Mean S
	$M_1(25)$	$M_2(50)$	$M_3(75)$	$M_4(100)$	
$S_0(0)$	2736	2996	3685	4141	3389
$S_1(25)$	3639	4328	5246	5256	4617
$S_2(50)$	3029	4063	4117	4266	3869
$S_3(75)$	3119	3375	4063	4248	3701
Mean M	3130	3690	4277	4477	
F test	S(S)	M(S)	SM(S)		
CD (P=0.05)	101.4	65.9	98.9		

* Recommended dose of mulch : 30 t/ha

Values denote dry ginger yield (kg/ha)

References

- Aclan F & Quisumbing E C 1976 Fertilizer requirement, mulch and light attenuation on the yield and quality of ginger. *Phil. Agric.* 60 : 183-191.
- Aiyadurai S G 1966 A Review of Research on Spices and Cashew in India, Indian Council of Agricultural Research, Regional Office (Spices and Cashew), Ernakulam.
- Ancy J 1992 Nutrient requirement of ginger (*Zingiber officinale* R.) under shade. MSc (Hort) Thesis, Kerala Agricultural University, Thrissur, Kerala.

- Jayachandran B K, Meerabai M, Abdul Salam M, Mammen M K & Kunjamma P Mathew 1991 Performance of ginger under shade and open conditions. *Indian Cocoa Arecanut Spices J.* 15 : 40-41.
- Jha R C, Maurya K R & Pandey R P 1972 Influence of mulches on the yield of ginger in Bihar. *Indian Cocoa Arecanut Spices J.* 9 : 87-90.
- Kerala Agricultural University (KAU) 1992 Final Research Report of ICAR Ad-hoc Scheme on Shade Studies on Coconut Based Intercropping Situations. Kerala Agricultural University, Vellanikkara, Thrissur, Kerala.
- Kerala Agricultural University (KAU) 1993 Package of Practices Recommendations, Kerala Agricultural University, Vellanikkara, Kerala.
- Mohanty D C 1977 Studies on the effect of different mulch materials on the performance of ginger in the hills of Pottangi. *Orissa J. Hort.* 5 (12) : 11-17.
- Valsala P A, Amma S P & Sudha Devi P K 1990 Feasibility of growing daincha in the interspaces of ginger beds. *Indian Cocoa Arecanut Spices J.* 19 : 65-66.