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,M3 which was closely followed by S,M (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* 30 t/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**

<table>
<thead>
<tr>
<th>Shade level (%)</th>
<th>Mulch level (% recommended dose*)</th>
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</thead>
<tbody>
<tr>
<td>S1 (0)</td>
<td>M1 (25) 2736 2996 3685 4141 3389</td>
</tr>
<tr>
<td>S1 (25)</td>
<td>M1 (50) 3639 4328 5246 5256 4617</td>
</tr>
<tr>
<td>S1 (50)</td>
<td>M1 (75) 3029 4063 4117 4266 3869</td>
</tr>
<tr>
<td>S1 (75)</td>
<td>M1 (100) 3119 3375 4063 4248 3701</td>
</tr>
<tr>
<td>Mean M</td>
<td>3130 3690 4277 4477</td>
</tr>
</tbody>
</table>

| F test         | S(S) 101.4 | M(S) 65.9 | SM(S) 98.9 |
| CD (P=0.05)    |           |           |           |

* Recommended dose of mulch: 30 t/ha

Values denote dry ginger yield (kg/ha)

**References**


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.


