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Performance of ginger in tamarind plantation (as intercrop) compared to sole cropping (Ginger)

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ABSTRACT

A field trail was conducted on medium black soil during 2003-2004 to study intercropping of ginger in tamarind plantation compared to sole cropping under irrigated condition. The experiment was laid out in six years old tamarind plantation spaced at 6 X 6 m (as intercrop) with three replications. Interception of Photosyntheficall active radiation (PAR) by ginger crop at 150 days after planting (DAP) as intercrop in tamarind plantation was 25,229 lux compared to 31,643 lux in open area. Significantly higher numbers of rhizomes were recorded under intercropping compared to sole cropping. Ginger grown as intercrop in tamarind plantation recorded higher yield (173.89 g/ plant) compared to sole crop in open area (117.17 g/plant).

Key words : Ginger, Tamarind, Sole corpping, Intercropping

INTRODUCTION

Tamarind (*Tamarindus indica* L) is one of the most important multipurpose domestic tree species grown commercially in dry zone of Karnataka. Intercropping in perennial plantation is one of the major forms of multiple cropping for increasing production and profit in available land. In intercropping system, productivity is improved either by efficient interception of available solar energy or by having crop of greater radiation use efficiency (Anon., 1979). There is no background information available on the performance of ginger as intercrop in tamarind plantation suiting the agronomic conditions of northern dry zone of Karnataka, Hence, a scientific approach to intercropping of ginger in tamarind plantation was undertaken to assess the comparative performance in young tamarind plantation and as a sole crop in open area.

MATERIALS AND METHODS

A field experiment was conducted at Kittur Rani Channamma College of Horticulture, Arabhavi. The soil of the tract was medium black with pH of 8.2.

The available nitrogen, phosphorus *and* potassium of the soil were 128, 56 and 140 kg per hectare, respectively. Ginger cv. HUMNABAD was grown is three replications both in tamarind plantation (as intercrop) and in open area (as sole crop). Statistical comparison was worked out to find out significance of results based on student't' test (Pause and Sukhatme, 1978) Recommended cultivation practice was followed as per the package of practices of University of Agricultural Sciences, Dharwad (Anon., 2002). Distribution of photosynthetically active radiation (PAR) was studied with the help of digital photometer (Lux meter). Intercepted PAR was calculated by deducting reflected radiation (Q_R.) and radiation reaching soil surface (Qs) with total radiation (Q_T). Reflection coefficient was worked out by dividing reflected radiation by total radiation. Economics of ginger cultivation was worked out on prevailing market prices during March 2004.

RESULTS AND DISCUSSION

Interception of photosynthetically active radiation (PAR) increased from 30 DAP to 120 DAP and it was maximum both in sole cropping 32114 and intercropping 26129 lux at 120 DAP (Table 1). Ginger grown as intercrop intercepted less PAR compared to ginger grown as sole crop. Reflection coefficient from crop canopy was lower in intercropping than sole cropping, indicating efficient use of available PAR. Similar results were also reported earlier by Kasturibai *et al.* (1991) and Balasimha. (1989). Significantly higher plant height and number of tillers per clump were recorded at harvest by ginger tamarind intercropping (33.40 cm and 11.33, respectively) compared to sole cropping (26.50 cm height and 7.06 tillers) as indicated in Table 2. Higher plant height and number of tillers per clump in ginger grown as intercrop in tamarind plantation is attributed to low light intensity and shade loving nature of ginger. Plant under diffuse light generally grow taller and produce more of foliage as observed in the present study. Similar results were also

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Table 1: Distribution of photo synthetically active radiation (PAR) by ginger as intercropping in tamarind plantation and sole crop in open area

Days after Planting	Intercrop					Sole crop				
	QT	QR	Q_S	QI	RC	QT	QR	Q_S	QI	RC
30	29050	1875	6537	20638	.065	31650	2440	7210	22000	.077
60	33000	1990	8685	22325	.060	40950	2850	15425	22675	.069
90	43500	2965	15618	24917	.068	51350	3623	19058	28669	.064
120	41950	2990	12831	26129	.071	41800	3175	6511	32114	.077
150	31150	1840	9081	25229	.059	42300	2820	7837	31643	.067

Q_T = Mean of total PAR Q_R = Mean of reflected radiation
Q_S = Mean of radiation at ground level Q_I =Intercepted PAR (Q_I =Q_T-Q_R-Q_S)

Table 2 : Growth attributed of Ginger as intercrop in tamarind plantation and as sole crop at different stage of growth

Sr. No	Growth attribute	90 DAP			120 DAP			At harvest		
		IC	SC	t-value	IC	SC	t-value	IC	SC	t-value
1.	Plant height (cm)	24.06	18.20	6.90*	29.13		7.99*	33.40	26.50	7.78*
2.	Pseudostem growth (cm)	0.87	0.82	2.52*	20.90		2.64*	1.04	0.85	2.52*
3.	Number of tiller per clump	5.60	3.66	5.85*	1.02		5.76*	11.33	7.06	9.29*
4.	Number leaves per tiller	52.76	41.61	4.02*	0.87		6.44*	130.70	119.37	8.14*
5.	Leaf area (cm^2)	16.28	14.86	4.86*	8.60		6.37*	24.02	20.32	10.14*
6.	Leaf area index	1.13	0.91	5.32*	6.06		7.47*	4.73	3.59	11.29*
7.	Dry weight excluding Rhizome (g/plant)	**	**	**	70.13	**		25.00	21.30	5.26*
					59.43					
					20.24					
					16.94					
					2.00					
					1.49					
					**					

DAP = Days after planting; IC = Intercrop; SC = Sole crop
* indicate of significance of value at P = 0.05 ** Recorded only at harvest

reported by earlier workers in ginger when grown as intercrop in popular (Jaswal *et al.*, 1993) and in arecanut (Thangaraj *et al.*, 1983). Ginger under tamarind plantation recorded significantly higher leaf area. Index (LAI) at harvest (4.73) compared to sole cropping (3.59). Higher LAI is attributed to shade prevailing in the plantation (Sujatha *et al.*, 1994). Significantly higher fresh weight of rhizome was recorded under intercropping (173.89 g/

Table 3 : Yield performance and benefit: cost ration of Ginger cultivation as intercrop in tamarind plantation and as sole crop in open

Sr. No.	Yield attribute	Ginger		
		IC	SC	t-value
1.	Fresh weight of rhizome (g/plant)	173.89	117.17	7.00*
2.	Number of primary rhizome per clump	5.80	3.13	5.57*
3.	Number of secondary rhizome per clump	15.00	9.73	8.93*
4.	Length of primary rhizome (cm)	5.35	4.33	7.22*
5.	Length of secondary rhizome (cm)	3.88	3.33	4.89*
6.	Girth of primary rhizome (cm)	5.09	4.57	4.12*
7.	Girth of secondary rhizome (cm)	4.14	3.28	7.57*
8.	Fresh rhizome yield per plot ($kg/3m^2$)	2.71	1.98	6.95*
9.	Fresh rhizome yield (q/ha)	90.33	66.11	6.95*
10.	Harvest index	87.43	80.61	4.54
11.	Crop duration	267	240	13.47*
12.	Benefit: cost ration	2.67	1.30	7.52

* indicate of significance of value at P = 0.05

plant) compared to sole cropping (117.17 g/plant) (Table 3). Yield attributes of ginger, *viz.*, number of primary rhizomes and length of primary rhizomes were higher in tamarind shade (5.80 and 5.35 cm, respectively) compared to sole cropping (3.13 and 4.33 cm, respectively). Higher yield of ginger tamarind intercropping may he attributed to increase crop duration (27 more days in shade than sole crop), higher harvest index (87.43% under intercropping compared to 80.61% in open) and shade loving nature of crop. Ginger as intercrop recorded higher benefit cost ratio (2.69) compared to ginger as sole crop (1.30). Similar findings were also reported by Jaswal *et al.* (1993) Jayachandran *et al.* (1992) and Thangaraj *et al.* (1983).

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