

INTERCROPPING IN TURMERIC

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ABSTRACT

A comparative field trial was carried out for two years on intercropping in turmeric with pulses like greengram, blackgram and redgram; vegetables like bhendi and onion; cereals like ragi (finger millet) and maize; green manure crop like sunnhemp. Intercrops like bhendi, onion, greengram (*Phaseolus aureus* L.) and blackgram (*Phaseolus mungo* L.) increased the yield of turmeric and the income. Maize and ragi as intercrops reduced the yield of turmeric and the income.

INTRODUCTION

Turmeric (*Curcuma domestica* Val.) is one of the important cash crops raised under irrigated conditions in wetlands and gardenlands of Tamil Nadu covering an area of 15,260 ha. It is raised as a pure crop as well as in combination with a number of pulses, millets and vegetables. Intercropping with castor reduced the yields of turmeric by 30 to 50 per cent at Coimbatore (Anon., 1924) as compared to pure crop. Aiyadurai (1966) reported that the shade crops of *arhar* and sunnhemp did not affect turmeric yield. Sundararaja and Thulasidas (1976) indicated that turmeric comes up well under partial shade conditions but high intensity of shade affects the yield adversely. The possibility of raising turmeric with chillies, colocasia, onion, brinjal and cereals like maize and ragi has also been suggested earlier (Sundararaja and Thulasidas, 1976; Rao, 1979). The present study was undertaken to investigate the effect of intercropping on turmeric yield, in order to select suitable and profitable intercrops.

MATERIAL AND METHODS

The experiment was laid out in the wetlands of Tamil Nadu Agricultural University, Coimbatore in three randomized blocks.

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The soil texture was clay loam where the availability of N and P_2O_5 was medium and K_2O high.

There were eight treatments comprising of a pure crop of turmeric and its combinations with greengram, blackgram, ragi, maize, onion, bhendi and sunnhemp in the first year. In the second year, redgram was included in addition to the above treatments. The turmeric crop was raised at a spacing of 45.0×22.5 cm in ridges and furrows. The intercrops were sown on the other side of the ridges. Along the ridges spacing between the plants was 22.5 cm for maize and bhendi, and 10.0 cm for other crops. The crop was uniformly manured with N, P_2O_5 and K_2O at 120, 60 and 60 kg/ha respectively. The nitrogen was applied in 3 splits i.e., 1/3 at planting, 1/3 at 60th day and 1/3 at 120th day. The sowings were done on 29th June in first year and 15th May in second year along with turmeric. Turmeric was harvested in April 1975 and March 1976. The intercrops like bhendi, greengram, sunnhemp, blackgram, onion, maize and ragi were harvested from 73 to 99 days after sowing depending on maturity of the respective crop(s).

RESULTS AND DISCUSSION

The results of first and second year are presented in Tables 1 and 2, respectively. The growth of turmeric crop was affected much when ragi and maize were raised as intercrops. The turmeric crop was pale and weak, and lodged when the intercrops of maize and ragi were harvested. The maximum height of turmeric was observed under sunnhemp intercrop which was almost on par with pure crop during the first year. However, during the second year, the pure crop showed the best growth followed by that having redgram as intercrop. Reduction in the number of leaves was more apparent with ragi and maize as intercrops. Due to quick growth of these cereals the turmeric was affected by their shading and smothering effect.

The highest rhizome weight of 402 g/plant was recorded in 'turmeric+bhendi' combination which was on par with 'turmeric+sunnhemp' combination during the first year. In the second year, 'turmeric+greengram' recorded the highest rhizome weight

Table 1. Growth and yield of turmeric, and economics of intercropping (First year)

Treatments	Plant Height (cm.)	No. of Leaves/plant	Rhizome weight (g/plant)	Value of turmeric Rs/ha @Re 1/kg	Yield of intercrop (Kg/ha)	Value of intercrop (Rs.)	Gross income (Rs.)	Additional income over pure crop (Rs.)
T ₁ :Turmeric	64.0	13.2	321	11412	—	—	11412	—
T ₂ :T ₁ + Greengram	62.5	13.1	360	12338	550	1100	13438	2026
T ₃ :T ₁ + Blackgram	60.4	13.7	301	10308	800	1600	11908	496
T ₄ :T ₁ + Ragi	40.5	7.2	204	4978	1360	2040	7008	—
T ₅ :T ₁ + Maize	45.2	8.2	285	6907	1950	4720	11627	215
T ₆ :T ₁ + Bhendi	54.5	11.6	402	13102	16000	6400	19502	8090
T ₇ :T ₁ + Onion	63.3	11.6	320	10926	4000	2000	12925	1513
T ₈ :T ₁ + Sunnhemp	65.8	12.9	375	12375	7500	750	13126	1713
SE	2.9	0.98	8.9	794				
CD P<0.05	9.1	2.15	27.0	240.7				

Table 2. Growth and yield of turmeric, and economics of intercropping (Second year)

Treatments	Plant Height (cm.)	No. of Leaves/plant	Rhizome weight (g/plant)	Value of turmeric Rs/ha @ Re 1/kg	Yield of inter crop (Kg/ha)	Value of inter crop (Rs.)	Gross income (Rs.)	Additional income over pure crop (Rs.)
T ₁ :Turmeric	76.0	6.5	420	15894	—	—	15894	—
T ₂ :T: + Greengram	61.9	6.2	468	15995	660	1320	17315	1421
T ₃ :T: + Blackgram	61.8	6.1	440	15366	650	1300	16666	772
T ₄ :T: + Ragi	50.8	5.0	340	13011	1780	2670	15681	—
T ₅ :T: + Maize	49.0	4.3	395	13321	2500	5000	18321	2427
T ₆ :T: + Bhendi	62.1	5.7	443	17542	15000	6000	23542	7648
T ₇ :T: + Onion	64.9	5.9	460	20149	2130	1065	21214	5320
T ₈ :T: + Sunnhemp	62.2	5.7	413	15869	10000	1000	16869	975
T ₉ :T: + Redgram	70.9	5.3	448	13984	450	1350	15334	—
SE	0.54	0.24	10.1	38.9				
CD P:0.05	1.62	0.72	21.3	116.7				

which was on par with onion and redgram. In both the years, the rhizome weight was the lowest with ragi followed by maize as intercrops.

The rhizome yield of 13,102 kg/ha obtained in turmeric+ bhendi (besides 16,000 kg/ha of bhendi) was on par with sunnhemp and greengram. The crop of turmeric yielded 11,412 kg/ha during first year. During the second year, turmeric+onion gave the highest turmeric yield of 20,149 kg/ha followed by 17,542 kg/ha with turmeric+bhendi besides the yield of 2,130 and 15,000 kg/ha of onion and bhendi, respectively. Turmeric yield was lower when ragi and maize were raised as intercrops. This might be due to the shade effect caused by maize and ragi crops during the critical early growth phase of turmeric. The initial setback caused by these intercrops affected the turmeric yield considerably. On the other hand, the leguminous intercrops because of shorter duration and their ability to fix atmospheric N, have helped the main crop.

Besides turmeric yield, the yields of intercrops were also considerably high. The highest total income of Rs. 19,502 and Rs. 23,542/ha was obtained with bhendi as intercrop during the first and second years, respectively. The additional income due to the various intercrops except ragi ranged from Rs. 215 to 8090 during the first year and from Rs. 772 to 7648 during the second year. These intercrops did not receive any additional dose of fertilizers nor any other cultural operation except sowing and harvesting. By growing these intercrops, not only the yield and the income had increased, but also the weed growth was reduced. This also affords the maximum utilization of the unit area in unit time. The gross income from the treatment, turmeric+ragi was the lowest during both the years. Though turmeric yields were low with maize, the income was more than the pure crop due to the higher yield and price obtained for maize. From this study, it is evident that turmeric can, profitably, be grown with intercrops like bhendi, onion, greengram and blackgram, whereas the cereals like ragi and maize as intercrops adversely affect the turmeric yields to a considerable extent,

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