

Intercropping of tuber and rhizome crops within mixed plantation of young lac hosts, *Albizia lucida* and *Moghania macrophylla*

B. K. PURKAYASTHA¹, B. P. SINGH² and MOTI RAM³

Indian Lac Research Institute, Namkum, Ranchi, Bihar 834 010

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ABSTRACT

The available space within young *Albizia lucida* Benth. and *Moghania macrophylla* (Willd.) O. Ktze might be utilized for growing sweet-potato + turmeric as intercrops without any deleterious effect on the host plants, thereby increasing the farmers' income per unit area any of land and reducing the cost of establishment of mixed plantation of lac hosts.

To explore the possibility of growing suitable intercrops in the vacant space at the initial stages of growth of 2 lac hosts, viz. *Albizia lucida* Benth. (*galwang*) and *Moghania macrophylla* (Willd.) O. Ktze (*bhalia*) grown under mixed plantation system (Purkayastha and Moti Ram, 1976) to supplement farmers' income per unit area of land, 4 tuber and rhizomatous crops, viz. tapioca (*Manihot esculenta* Crantz) sweet-potato [*Ipomoea batatas* (Linn.) Poir.], turmeric (*Curcuma domestica* Valet.) and ginger (*Zingiber officinale* Rosc.) were tested.

MATERIALS AND METHODS

The experiment was conducted in rain-fed plots at the farm of the Indian Lac Research Institute, Namkum, in 1978 in a randomized-block design with 10 treatments replicated 3 times. The net size of the plot was 7 m × 8 m for each treatment. The treatments were: (i) control (ii) tapioca (iii) sweet-potato (iv) ginger (v) turmeric (vi) tapioca + ginger (vii) tapioca + turmeric (viii) sweet-potato + ginger (ix) sweet-potato + turmeric and (x) sweet-potato + ginger + turmeric.

M. macrophylla and *A. lucida* plants were raised in the ratio of 3 : 1 with 1 row of *A. lucida* followed by 3 rows of

M. macrophylla plants. The spacing was 1.5 m within rows of *A. lucida* and 1 m within those of *M. macrophylla*. The spacing between the rows of both the lac hosts was 1.5 m. Stem cuttings of tapioca and vines of sweet-potato were planted in pits and ridges at a distance of 90 cm and 15 cm from plant to plant, respectively, in between rows of 2 lac hosts, both as pure and mixed crops. There were only 1 row of tapioca and sweet-potato in between the rows of lac hosts. Sprouted rhizomes of ginger and turmeric were planted in furrows at a spacing of 20 cm each from plant to plant, within and in between lac hosts. There were 2 rows of rhizome crops when they were grown in between the rows of *A. lucida* and *M. macrophylla* plants and 1 row when grown in between 2 rows of *M. macrophylla* plants. Fertilizers were applied at the doses prescribed for the respective crops.

RESULTS AND DISCUSSION

Observations were recorded on plant height, number of shoots and total shoot length/plant of both the lac hosts (Table 1). The yields of tuber and rhizome were recorded and the economics worked out (Table 2).

When tuber and rhizome crops were grown within and in between *A. lucida* and *M. macrophylla* bushes, there was no adverse effect on the growth of host plants except

¹Junior Arboriculturist, ²Scientist S (Agronomy), ³Scientist S-1 (Horticulture).

Table 1. Effect of intercrops on the growth attributes of *Albizia lucida* and *Moghania macrophylla*

Treatment (intercrops)	<i>Albizia lucida</i>			<i>Moghania macrophylla</i>		
	Plant height (cm)	Shoots/ bush (No.)	Total shoot length/ bush (cm)	Plant height (cm)	Shoots/ bush (No.)	Total shoot length/ bush (cm)
No intercrop (control)	51.1	1.5	62	95.4	12.4	609
Tapioca	48.1	1.3	49	85.7	5.8	211
Sweet-potato	72.9	1.6	106	125.9	21.0	1,076
Ginger	70.0	2.3	115	125.0	16.1	868
Turmeric	78.0	3.3	142	117.0	15.3	795
Tapioca + ginger	62.1	1.4	79	96.0	7.2	308
Tapioca + turmeric	68.8	1.1	73	103.3	10.0	475
Sweet-potato + ginger	71.4	2.3	117	128.8	19.2	984
Sweet potato + turmeric	82.2	2.9	152	131.3	18.0	939
Sweet-potato + ginger + turmeric	83.2	3.0	144	133.2	20.4	1,061
S. Em \pm	15.47	0.68	41.2	12.52	2.81	162
CD at 5%	NS	1.428	NS	26.292	5.901	340
CD at 1%	NS	NS	NS	36.058	8.093	467

Table 2. Yield and economics of intercropping with young lac hosts

Treatment (intercrops)	Yield of intercrops (q/ha)				Total revenue (Rs/ha)	Cost of culti- vation (Rs/ha)	Net return (Rs/ha)
	Tapioca	Sweet- potato	Turmeric	Ginger			
Control							
Tapioca	86.3				2,589	1,800	789
Sweet-potato		60.7			3,338	1,980	1,358
Ginger				13.6	2,720	2,670	50
Turmeric			35.9		5,385	2,900	2,485
Tapioca + ginger	116.6			1.5	3,798	2,600	1,198
Tapioca + turmeric	111.9		1.2		3,537	2,550	987
Sweet-potato + ginger		57.1		6.4	4,420	2,450	1,970
Sweet-potato + turmeric		44.6	20.3		5,498	2,680	2,818
Sweet-potato + ginger + turmeric		52.4	13.4	4.0	4,688	2,600	3,080

with tapioca (Table 1). Both the lac hosts grew taller when intercropped with sweet-potato+turmeric+ginger. The shoot length of *M. macrophylla* was more in plots where sweet-potato was grown either alone or in combination with ginger and turmeric, but in *A. lucida* it was best with sweet-potato+turmeric followed by sweet-potato+ginger+turmeric. As a result of intercropping with sweet-potato and turmeric or sweet-potato, ginger and turmeric there was an increase in plant height, number of shoots and shoot lengths in both the lac hosts, though the increase in height and total shoot length per bush were not significant on *A. lucida*. The increase might be owing to the indirect effect of fertilizers and to the cultural operations given to the intercrops. Tapioca with its spreading crown and thick foliage had an adverse effect on the growth of lac hosts. There was also reduction in the yield of turmeric and ginger when these rhizomes were grown within the rows of lac host along with tapioca.

Though the net return was highest when sweet-potato, turmeric and ginger were intercropped, the yield of ginger was very low when it was grown alone or in combinations with tuber crops. Growing sweet-potato and turmeric alone or in

combination as intercrops in between young lac hosts was most desirable and and profitable, involving less investment. Similar studies were made in coconut and arecanut plantations also (Khader and Antony, 1968 : Nelliath and Krishna, 1976). The net return was Rs 2,485/ha when turmeric was grown as the sole intercrop, and Rs 2,818/ha when turmeric+sweet-potato were grown. Thus turmeric either alone or in combination with sweet-potato may be the best cropping pattern with young *A. lucida* and *M. macrophylla* to increase the productivity per unit area of land, minimizing the cost of establishment of mixed plantation.

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