

INTERCROPPING BANANA VARIETIES IN COCONUT GARDENS

K. C. Rajan, U. Mohammed Kunju, V. L. Geethakumari and K. Elizabeth Syriac
Regional Agricultural Research Station, Kumarakom 686 566, Kerala, India

Different local varieties of banana are being cultivated by the farmers as intercrop in coconut garden. Ratooning is also followed by them. Information on the performance of different varieties and on the effect of ratooning of these varieties when grown as intercrops in coconut gardens of Kuttanad is very little. Preliminary trials conducted at the Regional Agricultural Research Station, Kumarakom during 1979-'81 revealed that among the varieties Palayamthodan, Monthan and Padathy were found promising in terms of yield when grown as an intercrop in coconut gardens (Anon., 1981). This investigation was therefore conducted to select the variety suitable for intercropping in coconut gardens of Kuttanad and to assess the economic feasibility of ratooning of different varieties in the area.

Materials and Methods

The experiment was conducted at the Regional Agricultural Research Station, Kumarakom, Kerala during the period 1981 to 1985. The design of the experiment was factorial RBD replicated three times. The treatments consisted of four varieties viz., Nendran V1, Monthan V2, Padathy V3 and Palayamthodan V4 and three ratooning practices viz., retaining one sucker per hill (S1), two suckers per hill (S2) and three suckers per hill (S3) during the second and third years. Thus there were 12 treatment combinations. During the first year, the experiment was started by planting single sucker per hill at a spacing 2 m x 2 m in all the treatments. Each plot consisted of 10 hills. From the second year onwards ratooning was practised as per the treatment. Thus in total one plant crop and two ratoons were taken. Fertilizers were applied based on the number of suckers per hill. A general dose of 200 g N, 200 g P₂O₅ and 400 g K₂O per sucker was given to all the varieties in two equal splits. Observations on height of plants, number of functional leaves, girth of plant at 20 cm height from the base at flowering, weight of bunch, number of hands per bunch and number of fingers per bunch at harvest were recorded. Desuckering was done as and when the new suckers appeared over the prescribed number in a treatment. Incidence of bunchy top disease and the effect of intercropping on the yield of the main crop (coconut) were also recorded. Economics of the practice was worked out.

Results and Discussion

Data recorded on various observations were statistically analysed and the mean data are presented in Table 1 to 6.

A. Plant crop

Among the four varieties tried maximum yield/ha was recorded by Monthan (35.05 t/ha) which was on par with Palayamthodan (32.93 t/ha) and superior to Padathy and Nendran. In general the weight of bunch was satisfactory under intercropping system in all the varieties except Nendran in the plant crop (Table 1).

Table 1
Performance of banana varieties (plant crop) in coconut garden

Variety	Height (cm)	Girth (cm)	No. of functional leaves/plant at flowering	No. of hand/bunch	No. of fingers per bunch	Yield of fruit t/ha
Nendran	329.8	60.4	11.3	5.2	43.6	14.99
Monthan	407.6	78.5	10.8	7.0	82.2	35.05
Padathy	394.8	78.8	11.3	7.5	99.2	25.81
Palayamthodan	351.0	72.6	10.8	11.2	179.2	32.93
CD (0.05)	32.27	4.52	NS	0.72	11.23	6.637
SEM±	13.18	1.14	0.31	0.29	4.58	2.719

B. First ratoon crop

Varieties varied significantly in yield of bunches per ha. Palayamthodan and Monthan were on par and significantly superior to Nendran and Padathy in yield. Ratooning three suckers per hill was found to be significantly superior to other systems of ratooning with respect to yield of bunches per ha. Interaction effect was significant and Palayamthodan with three suckers per hill recorded the maximum yield and was on par with Monthan with three suckers per hill. Different ratooning systems and variety-ratoon interactions had no significant effects on height of plants, girth and number of functional leaves at flowering. A decreasing trend was noticed in the girth of plant with increase in number of suckers per hill. Number of hands per bunch and number of fingers per bunch did not vary significantly with regard to systems of planting but S1 (retaining one sucker per hill) recorded the highest number of fingers per bunch (Tables 2 and 3)

C. Second ratoon crop

In the second ratoon also Palayamthodan recorded the highest yield of bunches per ha and was significantly superior to other varieties. Retaining three suckers per hill (S3) was found to be significantly superior to other ratooning systems with regard to yield/ha. As in the first ratoon. Palayamthodan with three suckers per hill recorded the highest yield and was on par with Monthan with three suckers per hill and was significantly superior to other variety ratoon interactions. Number of

hands and fingers per bunch did not vary significantly with number of suckers per hill. Maximum number of fingers per bunch was seen in S1 systems as in the previous ratoon crop (Table 2 and 3).

Table 2
Growth characters of banana varieties as influenced by ratooning systems

	Height of plant (m)		Girth of plant (cm)		Number of functioning leaves	
	I ratoon	II ratoon	I ratoon	II ratoon	I ratoon	II ratoon
V1	3.20	3.47	57.7	60.7	9.5	9.4
V2	4.05	3.74	78.9	73.1	10.6	9.5
V3	4.18	3.75	87.9	73.3	10.0	8.7
V4	3.80	3.66	80.1	73.3	9.6	9.1
CD (0.05)	0.24	0.18	4.53	3.78	0.73	0.79
SEM \pm	0.03	0.06	1.50	2.58	0.25	0.16
S1	3.77	3.32	78.0	66.5	10.2	9.0
S2	3.83	3.86	76.2	74.4	10.0	9.4
S3	3.81	3.79	74.2	69.4	9.6	9.2
CD (0.05)	NS	0.16	NS	3.27	NS	NS
SEM \pm	0.07	0.05	1.33	1.11	0.21	0.14
V1S1	3.24	3.06	61.9	53.7	10.3	8.1
V1S2	3.12	3.75	55.5	67.6	9.5	9.9
V1S3	3.24	3.59	55.6	60.8	8.9	9.3
V2S1	3.96	3.47	79.0	72.0	11.3	9.3
V2S2	4.20	3.89	77.9	75.0	10.3	9.4
V2S3	3.97	3.86	79.8	72.3	10.3	9.9
V3S1	4.08	3.39	89.4	70.2	9.6	8.5
V3S2	4.22	3.89	89.6	78.7	10.7	8.7
V3S3	4.24	3.96	84.7	71.0	9.8	9.0
V4S1	3.81	3.38	81.8	70.1	9.8	9.2
V4S2	3.79	3.87	81.8	76.2	9.5	9.5
V4S3	3.80	3.74	76.6	73.6	9.6	8.7
CD (0.05)	NS	NS	NS	NS	NS	NS
SEM \pm	0.14	0.11	2.31	2.23	0.43	0.29

Bunchy top incidence

Bunchy top incidence was recorded at the end of the second ratoon. Number of hills affected by bunchy top disease was counted and presented as percentage of total hills. Maximum disease incidence was noticed in Nendran variety and minimum in Palayamthodan. In the varieties disease incidence was more in S3 and S2. Ratooning one sucker per hill recorded the lowest incidence of bunchy top disease (Table 4).

Table 3

Yield attributes of banana varieties as influenced by ratooning systems

	Yield (t/ha)		Number of hands/ bunch		Number of fingers/ bunch	
	I ratoon	II ratoon	I ratoon	II ratoon	I ratoon	II ratoon
V1	22.24	13.01	4.80	5.15	41.9	44.5
V2	52.57	29.39	6.06	5.42	67.4	53.7
V3	48.34	23.41	8.00	6.75	99.1	76.2
V4	57.85	34.79	11.25	9.70	188.8	158.8
CD (0.05)	9.05	4.48	0.85	0.45	~18.09	6.90
SEM \pm	3.07	1.53	0.29	0.15	6.17	2.35
S1	26.83	15.50	7.79	6.81	109.2	85.8
S2	44.22	23.62	7.12	6.66	93.0	82.0
S3	64.69	36.32	7.75	6.81	95.7	82.2
CD (0.05)	7.79	3.83	NS	NS	NS	NS
SEM \pm	2.65	1.32	0.25	0.13	6.17	2.04
V1S1	11.59	9.64	4.70	4.93	38.7	42.4
V1S2	20.96	12.60	4.50	5.00	40.5	45.4
V1S3	34.15	16.80	5.33	5.53	46.6	45.6
V2S1	29.86	16.97	6.39	5.40	73.4	55.0
V2S2	49.41	27.32	5.91	5.43	64.9	52.7
V2S3	78.44	43.87	5.89	5.43	63.9	53.5
V3S1	31.60	13.06	8.11	6.93	115.6	77.7
V3S2	54.12	23.94	7.82	6.90	100.3	77.2
V3S3	59.29	33.24	8.75	6.44	81.5	73.6
V4S1	34.24	22.35	11.99	9.97	209.0	167.9
V4S2	52.40	30.63	10.24	9.30	166.6	152.7
V3S3	86.89	51.39	11.61	9.80	190.8	155.9
CD (0.05)	15.57	7.75	NS	NS	NS	NS
SEM \pm	5.31	2.64	0.51	0.27	10.68	4.08

Effect on the main crop (Yield of coconuts)

With regard to the yield of coconuts there was an increasing trend in the yield of nuts compared to the pre-treatment yield in majority of the treatments from the third year onwards (Table 5). This increase in yield may be due to the irrigation received by the banana plots and application of residues left after the harvest of the banana crop in coconut basins. The different agricultural operations including manuring given to the banana crop might have indirectly benefitted the main crop also.

Table 4
Bunchy top incidence

Treatments		Percentage incidence
Nendran	S1	27
	S2	47
	S3	57
Monthan	S1	7
	S2	23
	S3	23
Padathy	S1	17
	S2	20
	S3	20
Palayam-thodan	S1	0
	S2	13
	S3	3

Table 5
Effect on the main crop coconut (Yield of nuts/palm/year)

Treatments		Pre-treatment yield, nuts/palm	Post-treatment yield, nuts/palm			
			1982	1983	1984	1985
Nendran	S1	31.11	23.83	46.33	54.17	60.33
	S2	8.60	12.67	38.00	41.76	28.66
	S3	39.05	51.50	63.50	87.50	57.00
Monthan	S1	23.72	28.83	36.80	36.80	51.77
	S2	32.89	23.00	52.00	60.80	37.33
	S3	25.72	24.67	50.17	47.70	68.33
Padathy	S1	18.83	30.00	25.50	35.83	67.67
	S2	29.44	32.30	56.67	46.75	61.33
	S3	44.98	30.40	49.67	48.50	52.33
Palayam-thodan	S1	50.67	41.17	89.33	60.30	26.00
	S2	13.26	17.40	31.22	60.90	27.00
	S3	29.38	28.90	38.27	50.20	60.66

Economics of intercropping banana in coconut gardens

Palayamthodan gave the highest returns and highest B/C ratio in all the three systems (Table 6). Among the systems of ratooning S3 recorded the highest B/C ratio (3.32). Among the varieties Padathy recorded the lowest B/C ratio in all the systems.

Table 6
Economics of intercropping banana varieties in coconut garden

Treatment Combinations		Total cost of cultivation for 3 years (Rs '000)	Total returns/ha for 3 years (Rs '000)	Total profit, ha for 3 years (Rs '000)	B/C ratio for 3 years
Nendran	S1	35.77	64.95	29.18	1.82
	S2	43.69	89.61	45.12	2.05
	S3	51.61	124.39	72.78	2.41
Monthan	S1	35.77	65.51	29.74	1.83
	S2	43.69	89.42	45.73	2.05
	S3	51.61	125.89	74.28	2.44
Padathy	S1	35.77	58.99	23.22	1.65
	S2	43.69	87.88	44.19	2.01
	S3	51.61	101.33	49.72	1.96
Palayam-thodan	S1	35.76	89.52	53.76	2.50
	S2	43.69	115.96	72.27	2.65
	S3	51.61	171.22	119.61	3.32
No. of plots/ha		S1—1935,	S2—3870,	S3—5805	

Summary

Among the four varieties tried, Palayamthodan was found to be the best followed by Monthan for intercropping in coconut gardens. It can be concluded that two ratoons of Palayamthodan with three suckers per hill in the second and third years is the most remunerative systems. Though the per hectare yield was satisfactory in S2 find S3 systems individual bunch weight was reduced in second ratoon. The highest B/C ratio of 3.32 was recorded by Palayamthodan with three sucker per hill. Bunchy top disease incidence was maximum in Nendran especially in the ratoon crops with two or three suckers per hill in the second and third years.

References

- Anonymous. 1981. *Annual Report 1980—'81*. Kerala Agricultural University, Vellanikkara, Trichur, p. 87.