

## PERFORMANCE EVALUATION OF BANANA CULTIVARS IN THE RECLAIMED ALLUVIAL SOILS AS INTERCROP IN COCONUT GARDENS

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**Abstract:** Field experiments with different banana cultivars were conducted during the period 1988-92 in the coconut gardens of the Regional Agricultural Research Station, Kumarakom, Kerala to identify promising dessert and culinary types having good performance in the plant and ratoon crops. The results revealed that Palayankodan (AAB) was the best suited dessert cultivar for intercropping in coconut gardens since it gave the highest yield and highest net returns per ha in plant and ratoon crops. The study also indicated the suitability of Bathesa (ABB) and Monthan (ABB) the culinary types, for coconut gardens.

**Key words:** Banana cultivars, intercropping, Kuttanad, reclaimed soils.

### INTRODUCTION

A variety of annual and perennial crops are grown as intercrops in the coconut gardens of reclaimed alluvial soils of Kuttanad region of Kerala. Among these, banana has been identified as the most economic and ideal crop for growing in the interspaces of coconut.

At present, a number of banana varieties are grown irrespective of their yield potential and suitability to the tract. Preliminary studies conducted at the Regional Agricultural Research Station, Kumarakom to evaluate the widely popular varieties proved that Palayankodan (AAB), Monthan (ABB) and Padatty (AAB) are promising (Anon, *et al.* 1981). Further studies in this line by Rajan *et al.* (1988) confirmed the earlier findings. Suma *et al.* (1989) also proved, though in a different situation, the superiority of the cultivar **Palayankodan** (AAB) over the others in the partially shaded conditions of coconut gardens. The present study was undertaken to identify the ideal dessert as well as culinary varieties of banana for intercropping in the coconut gardens of Kuttanad, Kerala.

### MATERIALS AND METHODS

The experiments were conducted in the coconut gardens of the Regional Agricultural Research Station, Kumarakom during the period 1988-92. The coconut palms were in the age group of 25-30 years. The design of

the experiment was RBD with 15 treatments (varieties) and three replications. The treatments consisted of nine dessert types and six culinary types (Table 1 and 2) of banana. These cultivars were evaluated in the "plant crop" and subsequent "ratoon crop" for two seasons (altogether two plant crops and their first ratoon crops). A spacing of 2 m x 2 m was adopted (700 plants ha<sup>-1</sup> as intercrop). The crop received fertiliser dose of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O @ 200, 200 and 400 g respectively per plant in two instalments. All cultural operations were done as per the package of practices recommendations of the Kerala Agricultural University. The water table fluctuated between 0.50 m and 1.50 m below the soil level and there was no need to irrigate the crop.

### RESULTS AND DISCUSSION

#### Plant crop

##### a) Dessert types

Among the dessert types, Palayankodan AAB) recorded the highest bunch weight (13.90 kg plant<sup>-1</sup>) followed by Gros Michel (AAA). But they were on par with Poomkally (AAB), Robusta (AAA) and Poovan (AAB). These cultivars have almost the same duration.

Table 1. Growth and yield performance of dessert types of banana under partial shade of coconut palms

Cultivar	Bunch weight kg plant <sup>-1</sup>		No. of hands per bunch		No. of fingers per bunch		Plant height m		Plant girth cm	
	P	R	P	R	P	R	P	R	P	R
Nendran (AAB)	7.80	5.53	5.17	4.42	45.33	36.30	3.34	3.08	57.50	55.62
Gros Michel (AAA)	12.66	10.30	7.50	6.6	103.83	92.40	3.69	3.96	74.67	74.83
Njalipoovan (AB)	7.77	6.02	10.33	8.93	150.33	124.63	3.52	3.73	66.67	66.50
Poovan (AAB)	11.97	6.88	8.17	5.42	119.33	64.92	3.67	3.50	80.67	78.50
Chenkadali (AAA)	9.03	8.35	4.50	4.00	55.00	45.08	3.83	3.82	83.00	80.67
Palayankodan (AAB)	13.90	14.23	10.16	10.15	172.33	178.92	3.41	3.53	73.67	78.83
Poomkalli (AAB)	12.46	11.65	10.50	10.85	153.67	158.27	3.14	3.12	68.33	65.33
Robusta (AAA)	12.45	8.93	7.67	6.47	103.33	82.92	2.35	1.93	62.33	58.33
Kodappanillakunnan (ABB)	7.70	6.65	10.50	9.33	103.67	102.53	2.88	2.95	58.33	59.67
CD (0.05)	3.79	3.19	NS	0.83	NS	NS	NS	NS	16.15	NS

P = Plant crop

R = Ratoon crop

Table 2. Growth and yield of culinary types of banana under partial shade of coconut palms

Cultivar	Bunch weight kg plant <sup>-1</sup>		No. of hands per bunch		No. of fingers per bunch		Plant height m		Plant girth cm	
	P	R	P	R	P	R	P	R	P	R
Bathesa (ABB)	13.65	13.90	7.00	6.62	71.50	83.55	4.33	4.38	42.50	80.05
Lampi (ABB)	5.86	5.30	6.00	6.72	87.83	88.55	3.43	3.42	66.00	70.08
Peykunnan (ABB)	8.52	7.55	7.17	6.02	110.00	87.25	4.44	4.68	77.50	81.78
Monthan (ABB)	12.67	8.70	5.83	4.77	62.17	47.05	3.91	3.70	72.00	69.00
Pidimonthan (ABB)	7.43	7.38	7.50	6.63	92.50	85.22	3.78	3.65	69.67	69.17
Padatty (AAB)	9.33	8.07	7.00	6.72	86.50	85.82	3.85	3.83	77.33	80.00
CD (0.05)	2.73	NS	NS	0.83	NS	NS	NS	NS	16.15	NS

P = Plant crop

R = Ratoon crop

of 10-12 months. Chenkaclali (AAA) having the longest duration, was the tallest (3.83 m) among the cultivars with the maximum girth of pseudostem (83.00 cm).

#### b) Culinary types

Booditha Bontha Bathesa (ABB) was the highest yielder (13.65 kg plant<sup>-1</sup>) among the

Table 4. Economics of intercropping banana in coconut gardens (plant crop)

Cultivar	Yield kg ha <sup>1</sup>		Total income ha <sup>1</sup>		Cost of production, ha <sup>1</sup>		Net profit ha <sup>1</sup>		Benefit / cost ratio	
	P	R	P	R	P	R	P	R	P	R
Table types										
Nendran (AAB)	5460	3871	24570	17420	15022	9581	9548	7839	1.63	1.81
Gros Michel (AAA)	8862	7210	26586	21630	15022	9581	11564	1249	1.76	2.25
Njalipoovan (AB)	5439	4214	21756	16856	15022	9581	6734	7275	1.45	1.76
Poovan (AAB)	8379	4816	33516	19264	15022	9581	18494	9683	2.21	2.01
Chenkadali (AAA)	6321	5845	25284	23380	15022	9581	10262	13799	1.68	2.44
Palayankodan(AAB)	9730	9961	29190	29883	15022	9581	14168	20302	1.94	3.11
Poomkalli (AAB)	8722	8155	26166	24465	15022	9581	11144	14884	1.74	2.55
Robusta (AAA)	8715	6251	26145	18753	15022	9581	11123	9172	1.74	1.96
Kodappanillakunnan (ABB)	5390	4655	19404	16758	15022	9581	4382	7177	1.29	1.75
Culinary types										
Bathesa (ABB)	9555	9730	28665	29190	15022	9581	13643	19609	1.90	3.04
Lampi (ABB)	4102	3710	8204	7420	15022	9581	-6818	-2161	0.54	0.77
Peykunnan (ABB)	5964	5285	11928	10570	15022	9581	-3094	989	0.79	1.10
Monthan (ABB)	8869	6090	26607	18270	15022	9581	1585	8689	1.77	1.91
Pidimonthan (ABB)	5201	5166	13003	19581	15022	9581	-2019	3334	0.87	1.35
Padatty (AAB)	6531	5649	19593	12915	15022	9581	4571	7366	1.30	1.77

Total income from the cultivars was calculated based on the following market rates:

- a) Nendran @ Rs 4.50 kg<sup>-1</sup> b) Njalipoovan and Chenkadali @ Rs 4.00 kg<sup>-1</sup> c) Kodappanillakunnan @ Rs 3.60 kg<sup>-1</sup>  
d) Gros Michel, Palayankodan, Poomkalli, Robusta, Bathesa, Monthan and Padatty @ Rs 3 kg<sup>-1</sup> e) Pidimonthan @ Rs. 2.50 kg<sup>-1</sup>  
f) Lampi and Peykunnan @ Rs 2 kg<sup>-1</sup>

The economics of ratoon crop revealed the superiority of Palayankodan (AAB) as a good ratooner (Table 4) giving the maximum net profit and a benefit cost ratio of 3.11. The culinary cultivars followed the same trend as in plant crop.

A general increase in net profit per ha and benefit cost ratio was observed in the first ratoon due to lesser cost of production for ratoon crop.

The results show that Palayankodan (AAB) is the best cultivar suited for intercropping in coconut gardens since it gives the highest bunch weight and maximum net profit when both plant crop and first ratoon are taken into consideration. The cultivar Poovan (AAB), although recorded the highest benefit cost ratio and the maximum returns in plant crop, failed to show its superiority in the first ratoon. Moreover, this cultivar was highly susceptible to bunchy top disease. Hence Palayankodan

Table 3. Reaction of banana cultivars to major diseases

Sl. No.	Cultivar	Bunchy top* t>p*	Sigatoka**
<b>Dessert types</b>			
1	i Nendran (AAB)	14.40	12.00
2	Gros Michel (AAA)	12.25	64.00
3	Njalipoovan (AB)	10.40	44.00
4	•Poovan (AAB)	56.25	49.00
5	Chenkadali (AAA)	43.75	63.00
6	Palayankodan (AAB)	12.50	56.00
7	Poomkalli (AAB)	20.80	40.00
8	i Robusta (AAA)	37.50	45.00
9	Kodappanillakunnan (ABB)	16.50	34.00
<b>Culinary types</b>			
1	Bathesa (ABB)	8.00	45.00
2	Lampi (ABB)	14.55	56.00
3	Peykunnan (ABB)	4.10	60.00
4	Monthan (ABB)	10.25	37.50
5	Pidimonthan (ABB)	10.25	66.00
6	Padatty (AAB)	6.05	40.00

\* Per cent plants affected out of 24 plants

\*\* Percentage of infection on the leaves

culinary types, followed by Monthan (ABB). They were on par. Though Peykunnan (ABB) ranked first in the number of fingers per bunch (110), plant height (4.40 m) and pseudostem girth (77.50 cm), it was inferior to Bathesa (ABB) and Monthan (ABB) in bunch weight. In the case of Pidimonthan (ABB) also, the number of hands was the highest; but yield was low due to the smaller si/e of fingers and lesser number of fingers per hand.

### Ratoon crop

a) *Dessert types*: The ratoon performance was evaluated by retaining only a single sucker. In the ratoon crop also, Palayankodan (AAB) recorded the highest bunch weight (14.23 kg plant<sup>-1</sup>), the percentage increase over the plant crop being 2.38. Poomkally (AAB), however was on par (11.65 kg plant<sup>-1</sup>) with Palayankodan (AAB). The number of fingers

per bunch was also maximum for Palayankodan (AAB) followed by Poomkally (AAB). Bunch weight of all the cultivars except Palayankodan (AAB) was less in the ratoon crop than in the plant crop. The cultivar Palayankodan (AAB) recorded a better yield (bunch weight) in the first ratoon than in the plant crop.

b) *Culinary types*: In the ratoon also, Booditha Bontha Bathesa (ABB) recorded the highest bunch weight (13.90 kg plant<sup>-1</sup>) followed by Monthan (ABB). Bathesa (ABB) was significantly superior to all the other types and the increase in yield was 1.80 per cent over the plant crop.

### Incidence of pests and diseases

No specific incidence of pests was noticed on the cultivars tested. The reaction of the cultivars to the incidence of bunchy top disease (Table 3) indicated that Poovan (AAB) (56.25%) and Chenkadali (AAA) (43.75%) were the most susceptible. All the other cultivars were tolerant to this disease. Sigatoka leaf spot disease was severe in all the varieties. The incidence of the disease may be due to the high humid condition prevailing in the area. However, the occurrence of the disease did not affect the yield.

### Effect of intercrop on the main crop

The mean yield of nuts per palm at the commencement of the experiment was 18 per year and during the experimental period, it remained at the same level.

### Economics of intercropping banana in coconut gardens

The economics of cultivation of dessert and culinary types are presented in Table 4. In the plant crop, Poovan (AAB) was found to be the most profitable cultivar recording the highest net profit and the benefit cost ratio of 2.21. This was followed by Palayankodan (AAB). Among the culinary types, Bathesa (ABB) recorded the highest net profit with a benefit cost ratio 1.90 (Table 4).

(AAB) is adjudged as the most suitable cultivar for intercropping in coconut gardens. The result is in conformity with the findings of Rajan *et al.* (1988) and Suma *et al.* (1989). However, acceptability by consumers and demand in the market have also to be considered while selecting a cultivar for intercropping. Poovan (AAB) fetches a premium price in the market. Hence Poovan (AAB) also can be considered suitable for intercropping in areas free of bunchy top disease. Poomkally (AAB), with a high bunch weight and benefit cost ratio, is another cultivar in the dessert group ideal for intercropping.

Among the culinary types, Booditha Bontha Bathesa (ABB) and Monthan (ABB) are the two cultivars that can be recommended for intercropping in coconut gardens. In this case also, acceptability in the market is a criterion to be considered. Booditha Bontha Bathesa (ABB) is not a choice variety in the market while Monthan (ABB) is very popular. In homesteads, Monthan (ABB) is preferred to Bathesa (ABB) since the bunch of the latter is too large for home consumption.

## ACKNOWLEDGEMENT

We wish to place our deep sense of gratitude to Dr. R. R. Nair, Associate Director and Prof. P. A. Varkey for all facilities provided during the course of this investigation.

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