

## CROSS COMPATIBILITY OF BANANA CLONES

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**Abstract:** Studies were conducted in the Department of Pomology and Floriculture, College of Horticulture, Vellanikkara, Kerala on the cross compatibility of banana clones using 20 female and six male parents. Out of the 27 cross combinations tried, only eight combinations, all between triploid female and diploid male parents, were compatible. The results pointed out that interclonal hybridization is possible in banana using compatible clones. Seed production was maximum in the cross Agniswar x Pisang Lilin followed by Palayankodan x Pisang Lilin (AA) and Palayankodan x Sikuzani. The fertility pattern with reference to hands in a bunch showed varietal variation. Seed fertility was observed for the first time in Nendran, the leading commercial cultivar of Kerala, thus pointing out the possibility of improvement of this clone through hybridization.

### INTRODUCTION

The use of edible diploids as male parents, instead of wild parents, in banana breeding programme is of comparatively recent origin. The results of the hybridization conducted in the Tamil Nadu Agricultural University (Anon., 1982) point out the possibility of interclonal hybridization in banana. In the state of Kerala, practically no work has been carried out so far in banana breeding. Therefore, an attempt was made to collect information on the various aspects of cross compatibility of banana clones.

### MATERIALS AND METHODS

Twenty clones of banana were used as female parents and six clones as male parents for the study. Twenty seven cross combinations were tried among them, which included one diploid x diploid, twenty three triploid x diploid, one triploid x triploid and two triploid x tetraploid crosses. For hybridization purpose, the inflorescences of selected female parents were bagged using muslin cloth bags two to three days before the opening of the first bract. Anthers were collected from the male parents just prior to dehiscence and the pollen grains were taken out and they were smeared on the stigma

of the female flowers after opening the cloth bags. The receptivity of the stigma was ensured by the stickiness to touch. After pollination the inflorescences were rebagged. The crosses were made between 7 am and 10 am on the day of bract opening. For seed extraction, the fully mature bunches were harvested and ripened in room. The ripe fingers were longitudinally cut and the seeds when present were extracted carefully.

### RESULTS AND DISCUSSION

Of the 27 cross combinations tried (Table 1), compatibility was found in the case of only eight combinations listed in Table 2, thus pointing out the existence of incompatibility between certain clones. The successful crosses were between triploid and diploid clones. Pisang Lilin and Sikuzani were the only compatible ones with various female parents, out of the six male parents tried. Nendran which was earlier reported to be female sterile (Alexander, 1970) produced seeds when crossed with Sikuzani indicating its female fertility and compatibility with Sikuzani.

The use of cultivated clones for breeding purposes instead of the wild parents is of comparatively recent origin

Table 1. Details of crossings made using different clones

Sl. No.	Female parent	Male parent	No. of flowers pollinated
<i>Diploid x Diploid</i>			
1	Pachachingan (AA)	Pisang Lilin (AA)	135
<i>Triploid x Diploid</i>			
2	Vamanakeli (AAA)	Namarai (AA)	84
3	Vamanakeli (AAA)	Pisang Lilin (AA)	82
4	Agniswar (AAA)	Pisang Lilin (AA)	230
5	Padali Moongil (AAA)	Pisang Lilin (AA)	99
6	Padathi Poonani (AAA)	Pisang Lilin (AA)	230
7	Pedda Pacha (AAA)	Pisang Lilin (AA)	323
8	Harichal (AAA)	Pisang Lilin (AA)	283
9	Amrit Sagar (AAA)	Pisang Lilin (AA)	134
10	Amrit Sagar (AAA)	Namarai (AA)	66
11	Malakali (AAB)	Pisang Lilin (AA)	249
12	Lacatan (AAA)	Pisang Lilin (AA)	287
13	Motta Poovan (AAB)	Pisang Lilin (AA)	181
14	Palayankodan (AAB)	Pisang Lilin (AA)	559
15	Palayankodan (AAB)	Sikuzani (AA)	684
16	Palayankodan (AAB)	Tongat (AA)	788
17	Pacha Naadan (AAB)	Pisang Lilin (AA)	159
18	Nendra Vannan (AAB)	Pisang Lilin (AA)	170
19	Krishna Vazhai (AAB)	Pisang Lilin (AA)	148
20	Karim Kadali (AAB)	Pisang Lilin (AA)	109
21	Zanzibar (AAB)	Pisang Lilin (AA)	48
22	Mannan (AAB)	Pisang Lilin (AA)	176
23	Nendran (AAB)	Sikuzani (AA)	116
24	Vannan (AAB)	Pisang Lilin (AA)	151
<i>Triploid x Triploid</i>			
25	Zanzibar (AAB)	Pisang Lilin (AA)	41
<i>Triploid x Tetraploid</i>			
26	Nendra Vannan (AAB)	Bodies Altafort (AAAA)	100
27	Harichal (AAA)	Bodies Altafort (AAAA)	138

Table 2. Continued

Sl. No.	Parental plants	Position of hand	Total No. of seeds	Mean No of seeds per hand	Mean No. of seeds per bunch
1	2	3	4	5	6
5	Mannan (AAB) x Pisang Lilin (AA)	1-2	-	-	1.67
		3	2	0.67	
		4-5	-	-	
		6	3	1.00	
		7	-	-	
Total			5		
6	Nendra Vannan (AAB) x Pisang Lilin (AA)	1	-	-	0.33
		2	1	0.33	
		3-8	-	-	
Total			1		
7	Lacatan (AAA) x Pisang Lilin (AA)	1	-	-	1.33
		2	-	0.33	
		3-4	-	-	
		5	2	0.67	
		6	1	0.33	
7	-	-			
Total			4		
8	Nendran (AAB) x Sikuzani (AA)	1	-	-	3.67
		2	2	0.67	
		3-5	-	-	
Total			2		

(Alexander, 1970; Azakiamanavalan and Rao, 1980). The present studies indicate that the triploid clones belonging to different genomic groups appear to be promising material for hybridization in banana with diploid clones and that interclonal hybridization is possible, if the clones used as female and male parents are compatible.

### Seed production

Seed production was maximum in the cross Agniswar x Pisang Lilin followed by Palayankodan x Pisang Lilin and Palayankodan x Sikuzani (Table 2). In other successful combinations seed production was very low, inspite of the crosses being compatible.

Table 2. Compatibility and pattern of fertility in banana clones with respect to position of hands

Sl. No.	Parental plants	Position of hand	Total No. of seeds	Mean No. of seeds per hand	Mean No. of seeds per bunch
1	2	3	4	5	6
1	Agniswar (AAA) x Pisang Lilin (AA)	1	8	2.57	25.33
		2	10	3.33	
		3	28	9.33	
		4	15	5.00	
		5	9	3.00	
		6	6	2.00	
		7-8	-	-	
Total			76		
2	Palayankodan (AAB) x Pisang Lilin (AA)	1	5	1.67	9.67
		2	2	0.67	
		3	8	2.67	
		4	3	1.00	
		5	4	1.33	
		6	2	0.67	
		7	3	1.00	
		8	2	0.67	
		9-15	-	-	
Total			29		
3	Palayankodan (AAB) x Sikuzani(AA)	1	-	-	5.00
		2	4	1.33	
		3	4	1.33	
		4	4	1.33	
		5	2	0.67	
		6-9	-	-	
		10	1	0.33	
		11-15	-	-	
Total			15		
4	Harichal (AAA) x Pisang Lilin (AA)	1	1	0.33	0.67
		2	-	-	
		3	1	0.33	
		4-8	-	-	
Total			2		

The fertility pattern with reference to the hands in a bunch showed variation (Table 2). In the case of the clones, **Agniswar** and **Palayankodan**, the basal hands up to the middle of the bunch were fertile as indicated by the seed set. Fertility in basal hands was found in the case of **Harichal**, **Nendravannan** and **Nendran** while it was distributed in the case of **Mannan** and **Lacatan**. The difference in the fertility pattern of a bunch in cultivated banana was also reported by the **Langhe** (1969).

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