

Production of Quality Planting Materials for the Root (wilt) Disease Prevalent Tracts

R. V. Nair, P. M. Jacob and R. Ajithkumar

Central Plantation Crops Research Institute, Regional Station
Krishnapuram P. O. Kayangulam, Kerala - 690 533. India

The coconut root (wilt), reported over a century ago in Kerala, is contiguously prevalent in eight southern districts. According to the survey conducted during 1984, this disease causes an annual loss of 968 million nuts and affects about 10 million palms. In the contiguously diseased areas, vast majority of the plants have succumbed to the disease.

One of the major constraints affecting coconut production, particularly in the root (wilt) prevalent tracts, is the lack of quality planting materials. Due to the increased incidence of root (wilt) disease, a large number of palms are cut and removed annually. As a result, there is an increasingly huge demand for quality planting materials.

A comprehensive programme for large scale production of quality planting materials for the root (wilt) prevalent tracts is being implemented at CPCRI (RS), Kayangulam, since 1987 (Jacob *et al.*, 1998). Towards this end, five seed gardens have been established by planting seedlings produced by crossing selected mother palms in farmers' plots. This programme, which is being implemented in collaboration with agencies like Coconut Development Board, Department of Agriculture of Government of Kerala etc, assumes considerable significance, as it could be adopted for other national research programme in coconut, by establishing seed gardens aimed at improving yield, disease resistance/tolerance or other characters.

It was observed that in the disease

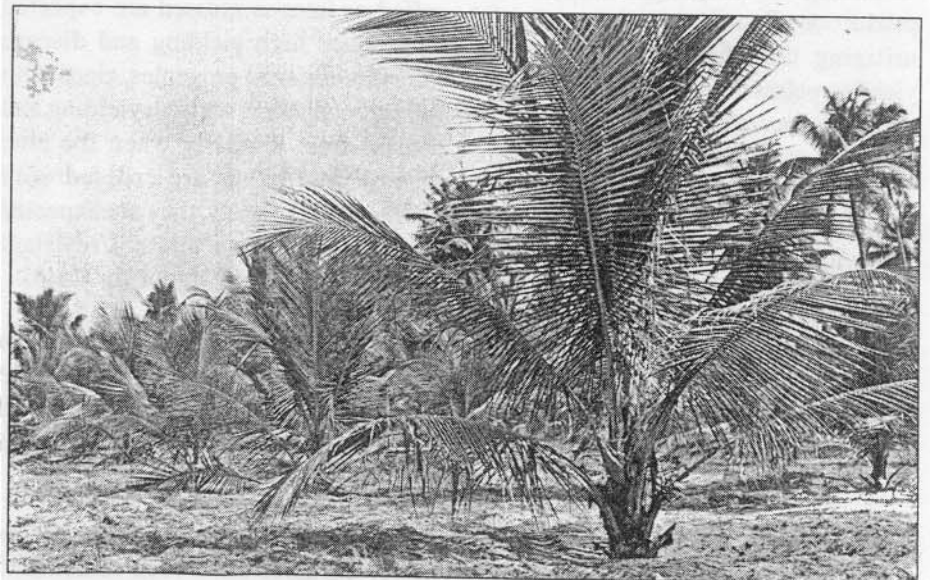
endemic areas of Kottayam, Alappuzha, Kollam and Pathanamthitta districts, in the midst of heavily disease affected palms, disease free and high yielding West Coast Tall (WCT) palms are found, and these palms are identified as the base material for the production of quality planting materials. Studies have indicated that typical Chowghat Green Dwarf (CGD) palms are comparatively disease free (Nair *et al.*, 2000). In the disease endemic areas, healthy and disease free Chowghat Orange Dwarf (COD) palms are also found. Studies at this Institute have indicated that natural cross dwarf coconuts (NCD hybrids) produced by the natural crossing of WCT and COD exhibited higher tolerance to the disease as compared to the WCT cultivars (Rawther and Pillai, 1972). These hybrids also gave higher yield in spite of contracting the disease. On the basis of these observations, a

crossing programme for the production of quality planting materials was launched.

Selection Criteria of Parental Palms Employed in the Crossing Programme

A. West Coast Tall (WCT)

1. Parental palms should yield 80 nuts or more per year.
2. Palms should be regular bearers and absolutely free from all diseases and pests
3. Palms should be more than 35 year old and surrounded by palms of which at least 80% are affected by root (wilt) disease in an endemic area.
4. WCT mother palms should have typical characters. 25 open pollinated seedlings are grown from each mother palm and all of them should show uniform vigour and characters



Seedlings planted for establishing nucleus seed garden



of typical WCT palms. This progeny test is done to cull out hybrid mother palms, if any.

5. Palms should be serologically negative and the serological tests are to be repeated every year.

B. Chowghat Green Dwarf (CGD) / Chowghat Orange Dwarf (COD)

1. Parental palms should be more than 20 years old.
2. Palms should yield 100 nuts or more per year.
3. Palms should show typical CGD/ CDO characters.
4. Palms should be free from all diseases and pests and surrounded by palms of which at least 80% are affected by root (wilt) disease in an endemic area.
5. Palms should be negative in their reaction to root (wilt) antiserum.

The serological tests have to be repeated every year.

A large-scale programme for the production of quality planting materials, utilizing the disease-free and high yielding palms of WCT, CGD and COD varieties, located in the hot spots, was launched at CPCRI (RS) Kayangulam. These mother palms are spread over a distance of nearly 100 kms in four adjacent districts.

The following crossing programmes were carried out for the production of breeder's seed, for establishing nucleus seed gardens in the different root (wilt) disease prevalent districts.

1. WCT (Selfed / Inter-se)
2. CGD (Selfed / Inter-se)
3. COD (Selfed / Inter-se)

Crossing programme carried out during 1999 consisted of 63 WCT, 97 CGD and four COD palms.

Table 1. Details of the seed gardens established

Location*	Year of start	No. of seedlings planted				Total
		WCT x WCT	WCT self	CGD x CGD Inter se / selfed	COD x COD Inter se / selfed	
CPCRI (RS), Kayangulam. (Alappuzha)	1992	1779	270	68	35	2152
CPCRI (RC), Kannara (Trichur)	1995	655	285	250		1190
CDB Farm, Neriamangalam (Ernakulam)	1996	334	108	149	56	647
D A Farm, Mavelikkara (Alappuzha)	1999	236	175	554	130	1095
Agricultural Farm, Karunagappally (Kollam)	2000	09	107	235	51	402
Grand Total		3013	945	1256	272	5486

* Name of the district given in brackets

Elite WCT palms, when they are selfed or inter-se crossed are expected to produce high yielding and disease tolerant / resistant progenies, since both the parental palms are high yielding and disease-free. Similarly when the elite disease-free palms are crossed with CGD or COD variety, they are expected to produce disease tolerant/resistant hybrids with hybrid vigour for yield.

Five nucleus seed gardens have been established in the root (wilt) disease prevalent tracts. Details of the seed gardens established, are given in Table -1.

A total of 5486 seedlings spread over nearly 78 acres have been established in the root (wilt) disease prevalent tracts. These seed gardens are expected to produce 2.2 lakhs quality-planting

materials annually @ 40 seedlings per palm at the fully bearing stage. The annual requirement of quality seedlings in the eight southern districts is expected to be nearly 8 lakhs. These seed gardens when they come to the full bearing stage are expected to meet substantially the huge demand for quality planting materials. The Institute has plan to establish at least one seed garden each, in the farms of Department of Agriculture, Government of Kerala, in the remaining four districts. Grama Panchayaths will also be contacted for additional land for planting in the second phase.

Summary and Conclusion

A comprehensive programme for large-scale production of quality planting materials for the root (wilt) prevalent tracts is being implemented at



CPCRI Regional Station, Kayangulam since 1987. In the disease endemic areas, among the heavily diseased palms in farmers' plots, high yielding and disease free West Coast Tall (WCT), Chowghat Green Dwarf (CGD) and Chowghat Orange Dwarf (COD) palms were found. These mother palms were selected based on strict selection criteria, and they were artificially pollinated to produce quality-planting materials. These artificially pollinated seedlings were utilized for establishing nucleus seed gardens. These seed gardens when they come to the full bearing stage are expected to meet substantially the acute demand for quality planting materials in the root (wilt) prevalent tracts of Kerala. This programme, which is being implemented in collaboration with other agencies like Coconut Development

Board and Department of Agriculture, Government of Kerala, assumes considerable significance as it could be recommended for adoption by other national research programme in coconut, for the production of high yielding and disease resistant/tolerant planting materials.

References

- Jacob, P. M., Nair, R. V. and Rawther, T.S.S. 1998 Varietal resistance *In*: Coconut Root (wilt) disease ed. K.U.K. Nampoothiri and P. K. Koshy, CPCRI, Kasaragod, pp. 97-104.
- Nair, R.V., Jacob, P.M. and Ajithkumar, R. 2000. Screening of coconut varieties against root (wilt) disease. Paper presented in the Annual Symposium on Plant

Disease Management for Sustainable Agriculture. *Indian Phytopathology*. 53(3):371 (Abstract).

Rawther, T.S.S. and Pillai, R.V. 1972. Note on field observation on the reaction of coconut varieties to root (wilt). *Indian. J. Agri. Sci.* 42:747-749.

Nair, R. V., Jacob, P.M. Koshy, P.K., Sasikala, M and Nampoothiri, K.U.K. 2000. Breeding for resistance / tolerance to coconut root (wilt) disease. Paper presented in the International Conference on Plantation Crops (PLACROSYM XIV). 12-15th December 2000, Hyderabad, India. (Abstract).

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