

## Coconut varieties resistant to root (wilt) disease

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**In an intensive survey in the disease hot-spots of Alappuzha, Pathanamthitta, Kollam and Kottayam districts in Kerala, 200 CGD palms were observed for root (wilt) disease incidence.**



*Chowghat green dwarf*

**It was found that 75 per cent of them were disease-free, whereas the WCT palms standing in the same plots were diseased to the extent of 80 per cent or more indicating that CGD variety is having higher level of resistance to coconut root (wilt) when compared to other varieties.**

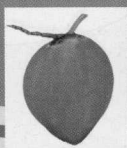
Coconut root (wilt) disease reported over a century ago in Kerala is now contiguously prevalent in eight southern districts. Sparse occurrence of this disease has also been reported from the remaining six districts of Kerala and also from parts of Tamil Nadu, adjoining Kerala State. According to the survey conducted during 1984, the annual loss due to the disease is estimated to be about 698 million nuts and the monetary loss assessed in terms of loss in husk, copra yield and leaf, on the basis of 1984 price index of coconut, was of the order of about Rs. 3000 million.

The disease is caused by Phytoplasma transmitted by lace wing bug (*Stephanitis typica*) and plant hopper (*Proteista moesta*). As the disease cannot be controlled by

conventional plant protection measures, planting of resistant varieties is the most practical method for the management of the malady. One of the most important constraints for coconut production in the root (wilt) prevalent tracts is the lack of root (wilt) resistant planting materials. Requirement for planting materials in the disease prevalent tracts is estimated to be 1.2 million seedlings. With the spread of the disease to more neighbouring districts in Kerala and adjoining states of Tamil Nadu and Karnataka, demand for seedlings is expected to increase further in the coming years. Eighty four cultivars and sixty eight hybrids from the coconut germplasm maintained at CPCRI, Kasaragod were screened during the period from 1961-1988 at CPCRI, Regional



*MGD*



Station, Kayamkulam and these studies indicated that none of the varieties/hybrids had satisfactory level of resistance to coconut root (wilt) disease.

Varieties resistant to coconut root (wilt) disease were not reported prior to 1988. A comprehensive breeding programme for resistance / tolerance to coconut root (wilt) disease was launched during 1988. Following varieties showing resistance to coconut root (wilt) under field conditions were identified since then.

**1. Chowghat Green Dwarf (CGD) :** This is a dwarf variety which is cultivated in the homesteads especially in root (wilt) disease-prevalent tracts. This is the shortest among all dwarf varieties of coconut. In an intensive survey in the disease hot-spots of Alappuzha, Pathanamthitta, Kollam and Kottayam districts,

200 CGD palms were observed for disease incidence. It was found that 75 per cent of them were disease-free,

higher level of resistance to coconut root (wilt) when compared to other varieties. This observation regarding



*Healthy WCT palm in midst of diseased palms*

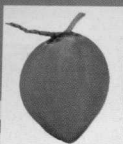
whereas the WCT palms standing in the same plots were diseased to the extent of 80 per cent or more indicating that CGD variety is having

resistance was further confirmed from a screening trial carried out at CPCRI RS, Kayamkulam involving CGD and nine exotic coconut varieties.

**Table 1. Morphological and nut characters of MGD, CGD, WCT and CGD x WCT hybrid**

Characters	MGD	CGD	CGD x WCT hybrid	Disease Free WCT palms
<b>Mean values</b>				
<b>Morphological characters</b>				
Age of measurement (years)	13	13	13	45
Plant height (m)	4.14	1.88	3.3	15.3
Number of leaves	29.80	25.0	30.3	29.2
Length of petiole (cm)	1.32	109.4	115.3	107.8
Length of leaflets bearing portion (cm)	3.60	342.8	375	349.3
Girth of trunk (cm)	69.80	60.2	78.7	92.6
Number of leaf scars in 1 m length	31.20	35.8	20.1	10.1
Length of inflorescence (cm)	89.70	69.2	112.0	93.1
Number of inflorescence per year	9.5	7.4	15.4	14.3
<b>Nut characters - Mature Nut</b>				
Length of fruit (cm)	19.9	17.0	18.7	20.5
Breadth of fruit (cm)	14.8	12.0	14.3	14.2
Weight of fruit (g)	854.0	683.4	839.2	1033.5
Weight of dehusked nut (g)	428.0	349.5	527.8	614.5
Weight of kernel (g)	355.2	171.2	295.7	347.1
Quantity of water (ml)	196.8	82.2	111.7	130.2
Copra weight	185.1	96.8	169.5	210.1
Oil content (%)	65.2	66.3	67.5	67.6
<b>Tender Nut</b>				
Quantity of nut water (ml)	275	172.3	373.3	260.4
Sweetness of water	4	4	3	3
Sweetness of meat	3	4	3	3

The CGD variety grows to height of nearly 1.88 m (13 year old palm) with narrow stem, marked with prominent leaf scars and shorter internodes. Detailed data on morphological and nut characteristics are given in *Table 1*. Among all the resistant varieties identified so far, CGD is the most resistant. In a study of 250 CGD palms at CDB Farm, Neriamangalam, it was observed that CGD gave 55 nuts/palm/year, producing copra yield of 0.94 t/ha and oil yield of 0.55 t/ha. The kernel has good cooking properties and good oil content. Tender nut water is also sweet and tasty eventhough the quantity is less. Because of the small crown size, this variety can be grown at a distance of 6.5 m x 6.5 m. It is more suitable for cultivation in homestead gardens, especially in Kerala where coconut is largely cultivated in small holdings. Because of the short stature, it can easily be



harvested, an advantage in Kerala where climbers are in shortage. But major disadvantages of this variety are small size of the nut and less copra content. Five CGD nuts are considered approximately equal to three WCT nuts for trade purposes.

**2. Malayan Green Dwarf (MGD):** This variety was identified as resistant to root (wilt) disease during 2004 from a comparative study of dwarf varieties planted at the DSP Farm of Coconut Development Board. The variety was introduced to India from Malaysia. This variety is a popular cultivar in many coconut growing countries as Malaysia, Jamaica, etc., This variety has significant advantage over CGD because of the higher yield, larger nut and copra weight and higher quantity of tender nut water. Tender nut meat is also sweet and tasty. At present, only 290 palms are available in India (200 palms in Seed Farm at Munderi, Malappuram district and 90 palms in CDB Farm at Neriamangalam, Ernakulam district). In a comparative study of yield of MGD and WCT palms, MGD gave 57 nuts/palm/year whereas WCT gave only 46 nuts/palm/year. MGD gave the highest copra yield of 1.835 t/ha. and oil yield of 1.2 t/ha whereas WCT gave copra yield of 1.69 t/ha. and oil yield of 0.95 t/ha only.

In Kerala, where there is a severe shortage of climbers, this variety will find greater acceptance because of its semi-tall habit and easiness in harvesting.

MGD is remarkable not only for its high yield but it is also suitable as a tender nut variety. It contains more quantity of tender nut water, which is sweet and tasty. The popular cultivated variety WCT is cross-pollinated and as a result each palm

is distinct from one another for the quality of tender nut water, whereas MGD is self-pollinated and hence all the palms are genetically identical. Since all the palms give similar quality and quantity of tender nut water, MGD variety is more suitable for tender nut purpose.

**3. Elite progenies from West Coast Tall (WCT) mother palms :** In the disease endemic areas, in the midst of highly diseased palms, healthy and high yielding WCT palms (minimum



*CGD x WCT hybrid*

of 80 nuts per palm per year) are occasionally found. Since the expression of resistance to root (wilt) disease and high yield are genetically controlled, the progenies of these palms are also expected to be relatively high yielding and disease-free, when compared to unselected seedlings of WCT. Government of Kerala in association with CPCRI and KAU has launched a statewide programme for large-scale production of quality planting materials by identifying superior mother palms in disease hotspots and raising seedlings from open-pollinated seed nuts of selected mother palms. This traditional method of producing quality planting material

is popular among the farmers.

**4. Chowghat Green Dwarf (CGD) x West Coast Tall (WCT) hybrid :** The hybrids, produced from selected high yielding and disease-free palms of CGD and WCT growing disease-hot spots were found to be high yielding. In the study of 31 CGD x WCT hybrids planted during 1991 at CPCRI, the CGD x WCT hybrids gave a ten year cumulative average yield of 71 nuts/palm/year, copra yield of 2.45 t/ha and oil yield of 1.43 t/ha. After 13 years of growth, more than 60 per cent of these hybrids showed symptoms of root (wilt) disease. The disease-free hybrids gave an average yield of 79 nuts/palm/year. The disease affected hybrids gave 67 nuts/palm/year indicating that those hybrids even when they are disease-affected, gave attractive yield indicating that they are tolerant to root (wilt) disease. With regard to resistance to root (wilt) disease, hybrid palms were intermediate between parental varieties namely CGD and WCT. The hybrid was superior in yield performance when compared to parental varieties. Integrated management practices centered around this hybrid variety, will result in high yield in the root (wilt) prevalent tracts of Kerala. Like other hybrids, CGD x WCT also requires good management for better performance.

#### Acknowledgements

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