

Coconut varieties tolerant to root (wilt) disease

The coconut root (wilt) disease, reported over a century ago in Kerala, is now prevalent in eight southern districts. Occurrence of this disease has also been reported from the remaining six districts of Kerala and also from some parts of Tamil Nadu, Karnataka and Goa adjoining to Kerala. A survey conducted during 1996 revealed that 24.1% of the 102 million palms in the disease endemic region are root (wilt) affected. The disease is caused by phytoplasma and transmitted by lace wing bug (*Stephanitis typica*) and plant hopper (*Proutista moesta*). As the disease cannot be controlled by any conventional plant-protection measures, developing resistant varieties and other management strategies are the most practical methods for the management of this malady.

A survey was conducted in root (wilt) disease affected areas during 1977-1981 to identify elite super palms exhibiting high-yielding potential. A total of 12 elite palms were selected from the root (wilt) affected areas of Kollam, Alappuzha and Kottayam districts of Kerala. Open-pollinated seed nuts from these palms were raised and planted in root (wilt) disease affected areas. But all of them took up the disease in subsequent years. Subsequently, a comprehensive breeding programme for evolving resistant/tolerant coconut varieties has been implemented. Progenies belonging to the crosses of West Coast Tall (WCT) × WCT (Inter se), WCT (self), WCT (mixed pollen) and WCT (open pollinated) were evaluated for root (wilt) disease resistance.

TOLERANT VARIETIES TO ROOT (WILT) DISEASE

Kalpasree

This variety was developed by selection made from Chowghat Green Dwarf (CGD) cultivar. The CGD is cultivated by farmers in the homesteads especially in root (wilt) disease-prevalent tracts. This is the shortest among all the dwarf varieties of coconut. In an intensive survey in the 'disease hot spots' of Alappuzha, Pathanamthitta, Kollam and Kottayam districts of Kerala, 200

CGD palms were observed for disease incidence, of which 75% of them were disease-free, whereas the WCT palms standing in the same plots were diseased to the extent of 80% or more indicating that CGD variety is having higher level of tolerance to coconut root (wilt) compared to the other local variety. This observation was further confirmed from a screening trial carried out at ICAR-CPCRI RS, Kayamkulam involving CGD and nine exotic coconut varieties.

Kalpasree grows to height of nearly 4.0 m (20 years old palm) with narrow stem, marked with prominent leaf scars and shorter internodes. Among all the varieties screened so far, Kalpasree is

the most tolerant to root (wilt) disease. This variety is grouped under the maturity group of early bearing. In a study of 250 CGD palms at Coconut Development Board Farm, Neriambangalam, Kerala, it was observed that CGD gave 55 nuts/palm/year, producing copra yield of 0.932 tonnes/ha and oil yield of 0.62 tonnes/ha. The kernel has good cooking properties and good oil content. Because of the small crown size, this variety can even be grown at a distance of 7.0 m × 7.0 m. It is more suitable for cultivation in homestead gardens, an advantage especially in Kerala conditions where coconut is largely cultivated in small holdings. Because of the short stature,



Healthy palm in midst of diseased palms



Kalpasree

it can easily be harvested, another advantage in areas where climbers are in shortage. However, caution is advised to adopt regular plant protection measures against major pests particularly red palm weevil, when large-scale commercial plantings are adopted.

It can be grown for tender nut purpose as it contains nut water of 200-240 ml and is very sweet in taste. The nutritive value of tender nut water: Total sugars- 4.80 g/ml, potassium content- 2150 ppm, sodium content- 22.40 ppm, TSS - 4.8° Brix. Data on fatty acid profile reveals that Kalpasree is rich in Long Chain Unsaturated Fatty Acids (LUSFA's) and is healthier compared to WCT and Chowghat Orange Dwarf (COD). Kalpasree oil is having ~25% to 40% more essential fatty acids during all seasons compared to oil from WCT and COD, respectively. Besides, Kalpasree oil is rich in essential fatty acids especially linoleic acid. There is very huge demand for Kalpasree seedlings from farmers in the root (wilt) diseased tract. But major disadvantages of this variety are small size of the nut and less copra content.

Kalparaksha

This variety is a selection from introductions of Malayan Green Dwarf made from Malaysia and was developed through evaluation and selection. Kalparaksha variety has significant advantage over Kalpasree because of higher yield, large nut and copra size and higher quantity of tender nut water. The observation on higher level of tolerance of Kalparaksha to root (wilt) disease of coconut was recorded during 2004 from a seed production plot of Coconut Development Board Farm, Neriamangalam, Ernakulam district, Kerala, planted with five dwarf varieties of coconut namely Malayan Green Dwarf (MGD), Malayan Yellow Dwarf (MYD), Malayan Orange Dwarf (MOD), Chowghat Green Dwarf (CGD), and Chowghat Orange Dwarf (COD). The popular variety West Coast Tall (WCT), cultivated in similar soil conditions in an adjacent plot was treated as the control. Kalparaksha showed 22.4% root (wilt) disease incidence compared to WCT with 84.0 % disease incidence, fifteen years after planting. The susceptible palms of Kalparaksha variety scored an average disease index of 15.5 in comparison to MYD, MOD and COD varieties with a disease index of 25, 28 and 20, respectively. The WCT with a disease index of 45.0 showed maximum intensity of disease among the varieties.

Kalparaksha attains a height of around 4.14 m at 12 years of age and comes to flowering by 55 months from



Kalparaksha



Kalpa Sankara

planting. Among dwarf varieties of coconut planted at Neriamangalam Farm, Kalparaksha recorded the maximum nut yield of 88.8 nuts/palm/year (average yield of five years), copra content of 185 g/nut, copra out turn of 2.88 tonnes/ha, oil content of 65.5% and oil yield of 1.89 tonnes/ha. Kalparaksha out yielded the popular cultivar WCT in all important yield attributes. No major pest attack observed in field conditions. However, under large-

scale plantings, precaution is advised against red palm weevil incidence. Kalparaksha can also be cultivated in large scale for the purpose of tender nut water. Tender nut water content of Kalparaksha is 290 ml and is sweet to taste. The nutritive value of tender nut water is as follows: total sugars - 4.92 g/ml, potassium content - 2100 ppm, sodium content - 19.50 ppm. As this variety is semi tall in nature, climbing for harvesting will be easy.

Kalpa Sankara

This coconut hybrid was produced by crossing root (wilt) disease-free Chowghat Green Dwarf as female parent and root (wilt) disease-free West Coast Tall as male parent. Disease-free parental palms were selected from 'hot-spots' of root (wilt) disease. It has a semi-tall nature with precocious bearing.

Kalpa Sankara attains a height of around 4.98 m at 18 years of age and comes to flowering by 36-40 months after planting and is grouped under the early maturity group. Kalpa Sankara gives a ten year cumulative average yield of 84 nuts/palm/year, copra content of 170 g/nut, copra out turn of 2.50 tonnes/ha and oil yield of 1.69 tonnes/ha. The agronomic features of this variety are the high yield, early bearing nature and tolerance to root (wilt) disease. Kalpa Sankara requires adequate plant protection measures against major pests, particularly red palm weevil when large-scale plantings are adopted. The quantity of tender nut water is 375 ml and sweet in taste.

Drought tolerance studies using different coconut hybrids reveals that tolerance to moisture stress is significant in CGD × WCT. The hybrid gives better yield under rainfed conditions at farmers' plots in the root (wilt) disease prevalent tract. Kalpa Sankara is rapidly becoming a popular coconut hybrid in the root (wilt) prevalent tract.

For further interaction, please write to:

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