



Demonstration of Integrated Management of Root (wilt) Disease Affected Coconut Gardens

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Coconut root (wilt) is a serious disease of coconut found mainly in the six southern districts of Kerala. Presently it is reported as scarcely distributed in all the other districts of the state besides its severe incidence in the border districts of Tamilnadu. It is not a lethal disease; but a debilitating disease, decreasing the production potential of the palms. The disease is caused by phytoplasma and transmitted by insect vectors like lacebug and plant hopper. CPCRI has recommended integrated management practices in the diseased tracts for adoption.

The recommended practices have been demonstrated in farmers' plots to prove their feasibility, practicability, and impact in field situations, which facilitates smooth transfer of technology and adoption. The package of practices are being modified based on the experiences and feedback from farmers and extension workers. The practices are given in brief as follows:

- Control of leaf rot disease. (Pouring 2ml of Contaf or 3g Dithane-M-45 in 300ml of water at the base of spindle leaf and putting 200g of sand mixed with 30g of Furadan or 20g of Phorate around the spindle base.)
- Application of balanced dose of fertilizers. (50g of organic manures+NPK-500 : 300: 1000 g in two split doses. One third in May-June and two third in Sept-October + 3kg Magnesium Sulphate in Onattukara region per palm. one kilo gram Magnesium Sulphate is sufficient in other regions.)
- Growing green manure crops like

Period	Investigators	Practices adopted	Impact of technology
1978-82	Menon, Nayar	Intercropping cassava, amorphophalus & greater yam	Nut yield of palms increased 5,15 & 8% respectively
1980	Anon.	Package of practices for root (wilt) management	Average nut yield increased from 28 to 51 .ie.83% increase in disease early stage
1982	Anon.	Root (wilt) management practices	Average yield of palms increased from 17.6 to 46 nuts / palm / year
1983	Ammal <i>et al.</i>	Mixed cropping with cocoa	27-35% increase in nut yield
1983	Sahasranaman <i>et al.</i>	Mixed farming in root (wilt) affected coconut gardens	Foliar yellowing reduced Rejuvenation of roots, increase in soil organic C, Ca, Mg & K reported. A net increase of 28.1% in nut yields
1986	Anon.	Root (wilt) management practices	Yield increased from 20.2 to 49.2 nuts/palm/year
1986	Muralidharan <i>et al</i>	Root (wilt) management practices	Average yield increase of 24.3 nuts /palm/year/under rainfed condition
1991-92	Anon.	Root (wilt) management practices with mixed farming	Average yield increased to 58 nuts /palm/year. The mean yield of apparently healthy palms were 70, disease early palms were 62 and disease middle palms were 40 nuts / palm / year respectively. Net returns were Rs. 13,761

Table 1

Table 2. Details of palms in farmers' plots (95-98)

Area	Bearing palms	Non bearing palms	Seedlings	Total	Apparently healthy	Disease early	Disease middle	Disease advanced
Plot - 1 (50 cents)	23	4	24	51	3	4	16	0
Plot-2 (100 cents)	61	10	29	100	0	27	25	9
Plot-3 (50 cents)	25	3	2	30	10	8	7	0
Plot-4 (50 cents)	33	6	7	46	16	8	6	3
Total	142	23	62	227	29	47	54	12
Percent	63%	10%	27%	100%	20%	33%	38%	9%

evaluate the technology (Table 1).

The Table 1 indicates increase in average yield and improvement in soil and plant health due to root (wilt) management practices. The details of the demonstration plots maintained during 1995-98 under rainfed condition are furnished in Table 2. The details of the palms in the plots are also given. The disease affected palms grown in the root (wilt) affected areas were classified as disease early and disease middle based on the disease index score.

The effect of management practices is given in Table 3. (In terms of average nut yield of palms.) The table shows an average increase in yield of 32 percent

Table 3. Average yield of palms

Plots (variety)	Area in Cent	Bearing palms	Age >40	Age >20- <40	Age >10- <20	Age <10 yield	1995 Av. yield	1996 Av. yield	1997 Av. yield	1998 Av. yield	% increase in yield
WCT	50	23	0	12	10	1	26	24	27	32	23
WCT	100	61	14	11	24	12	24	24	30	30	25
WCT	50	25	0	11	14	0	38	42	48	48	26
Hybrid	50	33	0	0	37	2	*	37	57	57	54
Average							29	32	36	42	32

calapogonium, sunhemp, crotolaria, pueraria, cowpea, etc in the basins by April-May and incorporating in August-September.

- Raising compatible intercrops and mixed crops or adopting mixed farming for organic recycling.
- Providing irrigation during summer months. (250 litres of water / palm / week).
- Removal of disease advanced uneconomic palms and disease affected juvenile palms

- Plant/replant only with high quality seedlings produced from high yielding, disease tolerant/resistant mother palms.



Preparing the fungicidal solution for pouring around the spindle base against leaf rot disease

Responses of the Technology in Farmers' Field

The technology has been demonstrated in farmers' field to establish the practicability, feasibility and relative advantage with suitable modifications. A quick look into the positive effects enables to

in the plots owing to adoption of recommended management practices. The maximum yield increase was observed in plot 4 where the hybrid varieties are planted. The disease early and apparently healthy palms responded to a higher level to the management practices than disease advanced palms.

Other Observations

1. The reduction in disease index score on an average is only marginal i.e. 2-4 points reduction
2. The leaf rot disease incidence in the newly emerging spindle could be checked.
3. The fresh attack of pests was



Integrated management of root(wilt) disease of coconut RECOMMENDATIONS

EFFECTS

ROOT (WILT) AFFECTED COCONUT PALMS

Control Leaf Rot Disease

- *Newly emerging leaves are protected -Photosynthetic Area increases
- *Appearance of the crown improves
- *Health & yield of the palm improves
- *Reduces the existing inoculum

Balanced Fertilizer Application with Organics & Chemicals including $MgSO_4$

- *Increases nutrient status
- *Improves yield & health of the palms

Green Manure sowing & Incorporation

- *Improves soil conditions
- *Cheap & simple practice
- *Adds organic content to soil
- *Basin management

Inter / mixed cropping / mixed farming

- *Improves yield & income for the homestead
- *Meet the needs of the farm family
- *Organic recycling is possible
- *Maximum & sustainable use of the natural resources

Irrigation / moisture conservation

- *Increases the yield of the coconut
- *Provision of drainage improves soil, root regeneration & preconditioning against stem bleeding etc.

Need Based Plant Protection

Removal of disease advanced palms

- *Avoids unproductive expenditure / use of natural resources
- *Reduces inoculum
- *Improves the appearance of the plot

Planting of quality seedlings

- *Critical for future yield performance & response to mangement
- *Since coconut is a perennial crop quality of the planting material is utmost important

Increases the average yield of the palms, Improves the productivity & Profitability



negligible due to prophylactic measures adopted. In the hybrid plots the incidence of eriophyid mite was also very negligible compared to the local varieties.

4. Plots with good quality planting materials responded to management practices profitably.

The per year maintenance charges per palm is given in Table 4.

Table 4. Maintenance charge per palm per year

Plots	Maintenance charge / palm/year	Average yield Nuts/palm	Value of produce (Rs)	Cost-Benefit ratio
1	Rs. 120.00	29.5	132.75	1:1.10
2	Rs. 120.00	30.0	135.00	1:1.13
3	Rs. 120.00	47.0	211.50	1:1.76
4	Rs. 120.00	56.0	252.00	1:2.10
Mean	Rs. 120.00	40.6	182.70	1:1.52

Inputs	Percentage
Fertilizers (Urea 1.1kg, Super Phosphate 1.7 kg, Mg 3 kg)	22.5%
Organics GM seed Other organics	25%
Plant protection (2 times per year)	15 %
Miscellaneous expenses	4.5%
Labour requirement. (Basin opening & fertilizer application, intercultivation & harvesting charges)	33%
Total	100%

The maintenance charge per palm per year is calculated to be Rs. 120 including all expenditure

The data show that small and marginal coconut farmers can improve the health of their palms, increase the yield and profitability by adopting recommended (wilt) management practices and planting good quality seedlings for high yield and performance.

The effects of adoption of recommended management practices are depicted in figure 1.

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