

# Efficacy of Management Practices for Increasing the Productivity of Root (Wilt) Affected Coconut Palms

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The root (wilt) disease of coconut, prevalent in the eight districts of southern Kerala, has been shown to cause marked decline in nut yield (Anonymous, 1985). The disease, with which mycoplasma-like organisms are associated (Solomon *et al.* 1983), is characterized by flaccidity of leaflets of middle and out whorl leaves as the primary symptom, with yellowing and necrosis as associated symptoms (Radha and Lai, 1972). Based on the intensity of the symptoms the disease index could be worked out and palms categorized as apparently healthy, diseased early, middle and advanced (George and Radha, 1973). As it is a debilitating disease, the nut yield is not adversely affected until the palms reach advanced stage. Recently, Muraleedharan *et al.* (1986) reported the response of diseased palms to management practices.

Though coconut palms respond favourably to summer irrigation (Nelliath and Padmaja, 1978; Bhaskaran and Leela, 1978), the response of diseased palms was

studied only recently with emphasis on the factors responsible for improvement in diseased palms with management practices (Rajagopal *et al.* 1986c). In a Five-Year pilot experiment conducted in farmers' plots, with small land holdings, 69% of diseased palms under well managed conditions (summer irrigation in basins with 250 litres per palm per week + recommended dose of fertilizer application and also cowdung + prophylactic measures with Bordeaux mixture,  $I_1 F_1$ ) showed significant improvement (decline in disease index), as against only 30% of the moderately-managed palms (fertilizer application and prophylactic measures,  $I_0 F_1$ ). On the contrary, palms under farmers' practice of ash or salt application but no fertilizer and irrigation ( $I_0 F_0$ ) tended to show deterioration (increase in disease index).

A critical analysis of the factors responsible for bringing about the improvement with irrigation clearly revealed that there was a significant reduction to the extent

of 57%, 60%, 40%, 60% and 43% respectively in flaccidity, yellowing, leaf rot, senescence and necrosis over the pre-treatment condition. Except flaccidity with 43% improvement, all the other symptoms showed only marginal improvement or no improvement with fertilizer application under rainfed conditions. Rajagopal *et al.* (1986c) explained these in terms of overall photosynthetic area, which recorded 55.3% improvement in irrigated palms, as against only 9.9% in rainfed palms. Figure 1 clearly depicts the efficacy of good management practices ( $I_1 F_1$ ) not only on the leaf condition, but on the ultimate yield and quality of nuts, as compared to poor management ( $I_0 F_0$ ). Thus, a scientific explanation, based on systematic data on all the aspects, is offered as to how the yield potential of diseased palms could be improved with suitable management.

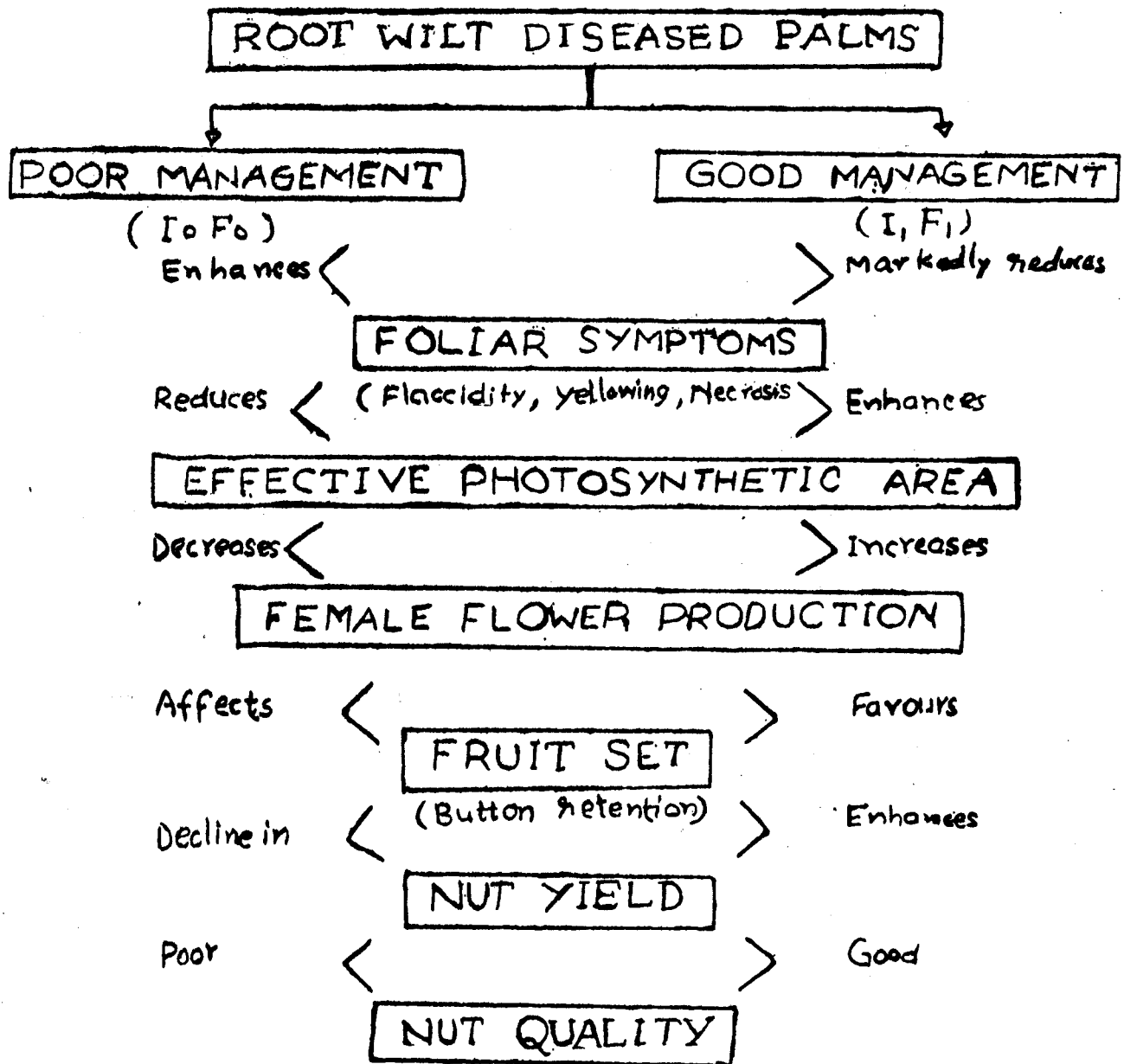
From Table 1 it is clear that the diseased palms, which responded positively (as indicated by decline

\*CPCRI, Kasaragod

in diseased index) to summer irrigation yielded about 10 nuts more during the post-treatment stage than during the pre-treatment stage. On the contrary, those diseased palms which received only fertilizer management maintained the status quo, while those

with neither irrigation nor fertilizers showed decline in nut yield. These could be attributed to variations in photosynthetic area, an essential yield-determinant, as explained already. Comparison of the 5 year average nut yield indicated that there was an increase

of 21 and 9 nuts respectively in palms under  $I_1F_1$  and  $I_0F_1$  treatments over the ill-managed ( $I_0F_0$ ) palms. Even the nut quality in  $I_1F_1$  showed an improvement (Anonymous, 1986). It is thus evident that the beneficial effect



FLOW CHART SHOWING THE EFFICACY OF MANAGEMENT PRACTICES IN THE ROOT (WILT) DISEASED COCONUT PALMS

was more pronounced with summer irrigation coupled with fertilizer application than the latter alone, since irrigation favours the uptake of water and nutrients, and their utilization too, as also substantiated by more greenness (reduction in yellowing and senescence) in these palms. The influence of irrigation could thus be noticed by way of improved water uptake by roots (Rajagopal *et al.* 1986 a) and lesser transpiration rate of leaves (Rajagopal *et al.* 1986 b), thus bringing about balanced water economy of palms. These factors obviously improved the health and vigour of palms and minimized their proneness to disease, as revealed by marked decrease in necrosis and leaf rot in irrigated palms (Rajagopal *et al.* 1986C). Obviously, prophylactic measures are more effective in

irrigated palms than in rainfed palms, as the water deficit condition is known to be a predisposing factor for plant diseases (Ayres, 1978).

The net returns from the essential economic products like nuts and leaves from the scientifically managed plots would be more than that being realized by the farmers in the ill-managed diseased tracts. In other words, adoption of the above management practices, which would ensure additional 15 to 25 nuts and 3 to 5 leaves per palm year as compared to the neglected palms, is beneficial to the farmer. There is further scope to push up the yield by enhancing the irrigation level depending on the water resources.

To conclude, though the occurrence of the disease cannot be controlled, the overall yield poten-

tial of palms, particularly those in the early and middle stages of the disease, can definitely be enhanced by adopting scientific management practices. As fertilizer management alone proved to have limited success, in view of poor recovery in photosynthetic area and ineffective prophylactic measures, the imposition of irrigation, wherever feasible, may be implemented to exploit the yield potential of diseased palms. Adoption of package of practices with irrigation by even pot-watering for small land holdings would go a long way in alleviating the plight of coconut growers of affected districts.

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**TABLE 1**  
**YIELD PERFORMANCE OF ROOT (WILT) DISEASED COCONUT PALMS**  
**WHICH RESPONDED TO MANAGEMENT PRACTICES**

	Nuts per palm per year		
	I <sub>1</sub> F <sub>1</sub> (19 palms)	I <sub>0</sub> F <sub>1</sub> (14 palms)	I <sub>0</sub> F <sub>0</sub> * (10 palms)
Pre-treatment**	36.5	30.0	26.8
Post-treatment**	46.9	29.5	18.5
5 years' average	40.3	27.8	18.7

\* Diseased palms not subjected to irrigation / fertilizer management but taken as farmers' control for comparison.

\*\* Two years' average.

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