RESPONSE OF COCONUT ROOT (WILT) DISEASE TO MANAGEMENT PRACTICES

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ABSTRACT

Data collected during the third year of a set of field experiments designed to elucidate the effect of an integrated management approach to coconut root (wilt) disease have revealed a favourable response. The observations lend support to the possibility of promoting the strategy to 'live with the disease' in a heavily infected tract, combined with the identification of unproductive palms.

INTRODUCTION

The coconut root (wilt) disease reported in 1882 still remains delineated to an extent in a contiguous manner in the eight southern districts of Kerala State, India stretching from Trivandrum to Trichur (Fig. 1). Its occurrence is relatively sparse in north of Trichur in Kerala and in the Kanyakumari and Coimbatore districts of the neighbouring Tamil Nadu. A recent survey undertaken in the contiguous tract has brought out its intensity ranging from 1.52 per cent and 2.60 per cent respectively in Trivandrum and Trichur districts to 70.69 per cent and 75.63 per cent respectively in Alleppey and Kottayam districts. The loss in yield due to the disease is 968 million nuts in 1984-85 (CPCRI, 1985). Since the implication of mycoplasma-like organisms (Solomon *et al.*, 1983) additional information has accrued in favour of mycoplasmal etiology of the disease (CPCRI, 1984). Experiments carried out in the past have brought out results in favour of formulating strategies for containing the disease in its present geographic limits (CPCRI, 1985) and managing the disease by sustaining productivity (Sahasranaman et. al., 1964; Menon and Nayar, 1978; Sahasranaman *et. al.*, 1964; Menon and Nayar. 1978; Sahasranaman et. al., 1983). The feasibility of an integrated approach to "live with the disease" in a heavily infected area formed the objective of the present study that has provided additional information on a possible rejuvenation.

MATERIALS AND METHODS

Six plots each comprising of 0.20 ha coconut garden under management treatment and an equal area under control were laid out in six farmers' fields around the CPCRI Regional Station, Kayangulam during the year 1982. Altogether there were 165 palms each under treatment and control. These palms were indexed for root (wilt) disease (George and Radha, 1973) and classified apparently healthy (AH = 10 index), disease early (DE = 11 to 25

index), disease middle (DM = 26 to 50 index) and disease advanced (DA = 51 index) groups. The management treatment consisted of an inegrated adoption of (1) removal of highly infected and non-productive palms (2) gap filling with D × T seedlings (3) balanced dose of nutrients (500g N, 300 g P_2O_5, 1000g K_2O, 500g MgO in two split doses as per package of practices), (4) application of farm yard manure (50 kg per palm per year), (5) green manuring with *Peuraria phaseolodies* grown in the basins, (6) pre and post-monsoon spraying with fungicides (1% Bordeaux mixture or 0.3% Dithane M - 45), (7) leaf axil filling with BHC and sand mixture, (8) intercropping with a rotation of elephant foot yam, ginger, dioscoria and colocasia, (9) restructuring the canopy of other perennial crop species and (10) weeding and intercultivation at appropriate seasons. The average yield of palms was estimated based on half yearly counts of nuts above six months old taken during the month of June and December.

RESULTS AND DISCUSSION

The effect of management practices as reflected on the yield of palms under different disease index groups during the third year from the commencement of the experiment is presented in Table 1. A perusal of the data revealed that the apparently healthy and disease early palms responded readily to the management practices. The yield of nuts from the apparently healthy palms increased by 23.3 nuts (39.8%) per palm during the third year over the respective control palms. The disease early palms also responded to the management practices giving an average increase of 12.5 nuts per palm (28.4%). As the disease advanced, the response narrowed down considerably. The middle diseased palms responded to the extent of 4.2 nuts per palm while the disease advanced palms

DISTRIBUTION OF COCONUT ROOT (WILT) DISEASE IN KERALA

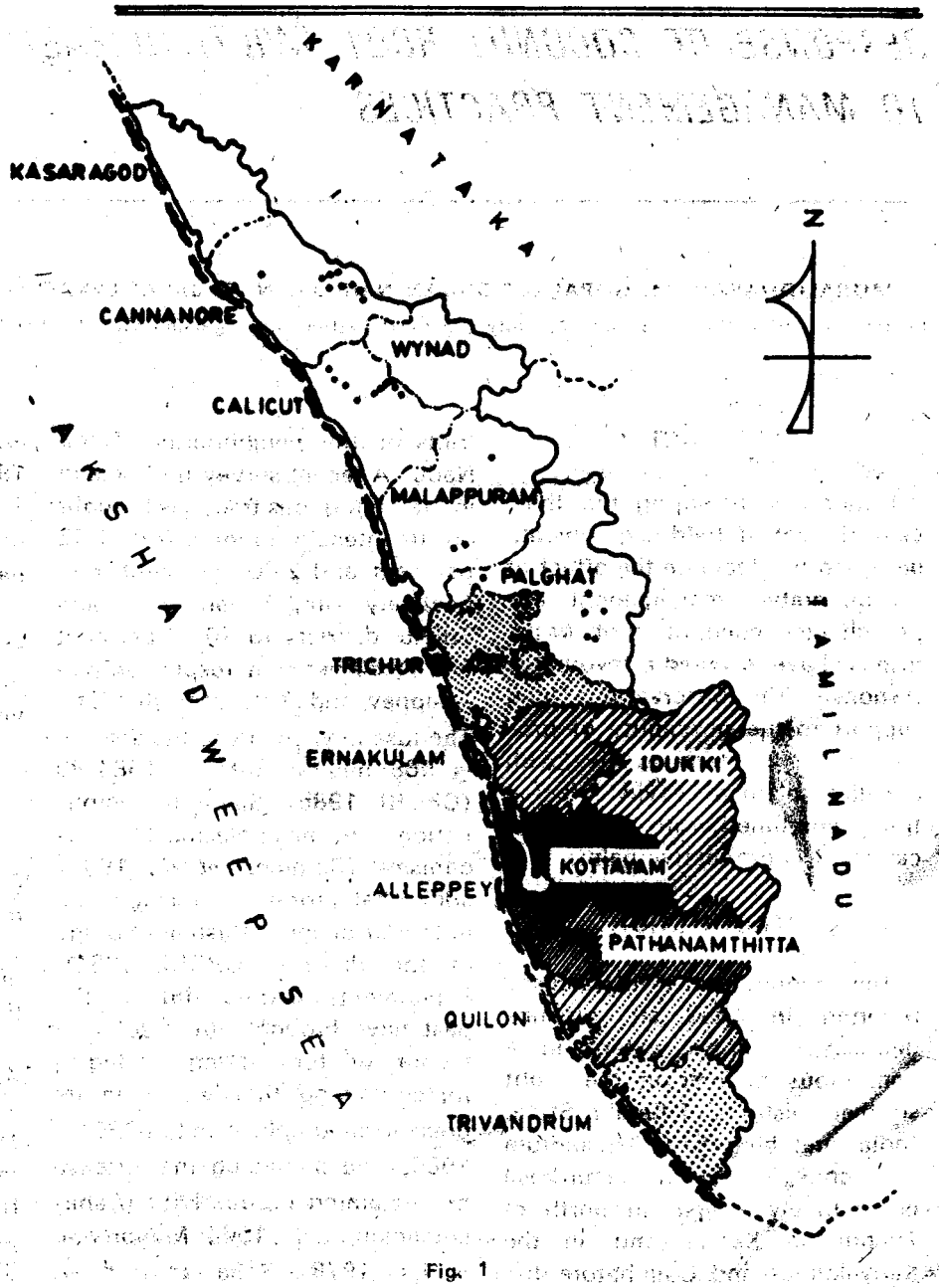

Fig. 1

did not show any response at all. It is obvious that the disease advanced palms will not pay back the investment made towards the cost of inputs required for adopting the management practices. The low response of disease advanced palms might be due to reduction in the photosynthetically active leaf area as a result of yellowing and necrosis caused by the disease. Evidently it can be asserted that managing of such palms will be uneconomic.

The response of palms receiving the management practices and the control, in terms of productivity over a period of 3 years commencing from 1982 is separately indicated in Tables 2 and 3 respectively. The impact of management was conspicuous even among the middle diseased palms; however, substantial increase in productivity was also observed in the control palms during the period. This is attributable either to climatic factors or to the lack of a total neglect that is contemplated in plots of seasoned farmers. The palms under the middle diseased groups can perhaps be retained without the adoption of costly inputs as these palms may still give a reasonable income to the farmers under a low level of management. The present observations lend support to the required strategy to eradicate disease advanced and unproductive palms in heavily diseased areas and to manage the rest of the stands by appropriate means.

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TABLE - 1

Effect of management practices on yield

Disease index	No. of palms studied		Average yield of palms (nuts/palm/year)				Increase over control during third year	
	Treatment	Control	Pre-experiment		Third year of experiment		Number	Percentage
			Treatment	Control	Treatment	Control		
			1982		1985			
AH (< 10)	83	98	43.5	40.8	83.0	59.7	23.3	39.0
DE (11-25)	45	29	26.4	29.9	56.5	44.0	12.5	28.4
DM (26-50)	29	32	17.7	18.7	32.3	28.1	4.2	14.9
DA (> 51)	8	6	8.0	9.7	12.4	12.2	0.2	1.6
Total / Mean	165	165	32.6	33.4	63.4	49.0	14.4	29.3

TABLE - 2

Average yield of experimental palms (Nuts/palm/year)

Disease index	No. of palms	Pre-experiment 1982-83	Post-experiment 1984-85	Increase in number during the third year
AH (< 10)	83	43.5	83.0	39.5
DE (11-25)	45	26.4	56.5	30.1
DM (26-50)	29	17.7	32.3	14.6
DA (> 51)	8	8.0	12.4	4.4
	165	32.6	63.4	30.8

TABLE - 3

Average yield of control palms (Nuts/palm/year)

Disease index	No. of palms	Pre-experiment 1982-83	Post-experiment 1984-85	Increase in number during the third year
AH (< 10)	98	40.8	59.7	18.9
DE (11-25)	29	29.9	44.0	14.1
DM (26-50)	32	18.7	28.1	9.4
DA (> 51)	6	9.7	12.2	2.5
	165	33.4	49.0	15.6