



Fig. 1
Exposing root system with the aid of water jet

A STUDY ON ROOT DECAY IN RELATION TO COCONUT ROOT (WILT) DISEASE

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INTRODUCTION

Coconut root (wilt) disease, known generally as *Kattuweezhcha* in the vernacular, is often referred to as *Verurogam* also. Attempts of Butler (1908) to assign a primary role for root decay caused by *Botryodiplodia theobromae*, in the incidence of root (wilt) disease perhaps lent support to continued use of the latter name. However, some investigators (Varghese, 1934; Maramorosch, 1964) had suggested that the root decay reportedly associated with root (wilt) disease, was neither primary nor a characteristic symptom of the disease. This and certain other recent observations prompted a fresh comparative study on the condition of the root system in healthy and diseased palms and the results are reported in this paper.

MATERIALS AND METHODS

The study was carried out by exposing the root system of 18 standing adult trees by washing off the soil from a zone of three metres radius from the bole and to a depth of two metres, the region harbouring the maximum number of roots of a mature palm (Nair, 1979), using a forceful jet of water from a polythene hose connected to a water supply system (Figures 1, 2, 3 and 4). The palms were in groups of nine in two locations of the

farm of Central Plantation Crops Research Institute, Regional Station, Kayangulam. Each group consisted of three apparently healthy palms (healthy looking palms in the diseased area), three palms in the middle stage of the disease and three in the advanced stage. Palms of one group (marked as group 1 in the table) stood in a low lying area and therefore, their roots were prone to prolonged submersion whereas, the other (marked as group 2 in the table) because of the low water table in the location, had their roots free from submersion. Soil in both the locations was sandy loam. Exposed roots were cut and collected. Then the main roots among them were categorised as healthy, decayed and regenerated according to Menon and Pandalai (1958) and Patel (1938) and counted separately for each palm.

RESULTS AND DISCUSSION

Table I presents the consolidated data of the observations recorded. Analysis of the data has brought out that the interaction between the rate of root decay and the condition of the palms namely, healthy and diseased, was not statistically significant. Difference in the rate of root regeneration was also not significant.

Except for the isolation of *B. theobromae* from certain roots of diseased palms, Butler (1908) did not make any serious efforts to determine the role of the fungus in inciting root (wilt) disease. Nor did he ever try to estimate the extent of root decay in such instances, let alone a comparative study between healthy and diseased palms. Reported rate of root decay, as high as 92.4 per cent, associated with root (wilt) disease (Anonymous, 1976), was estimated

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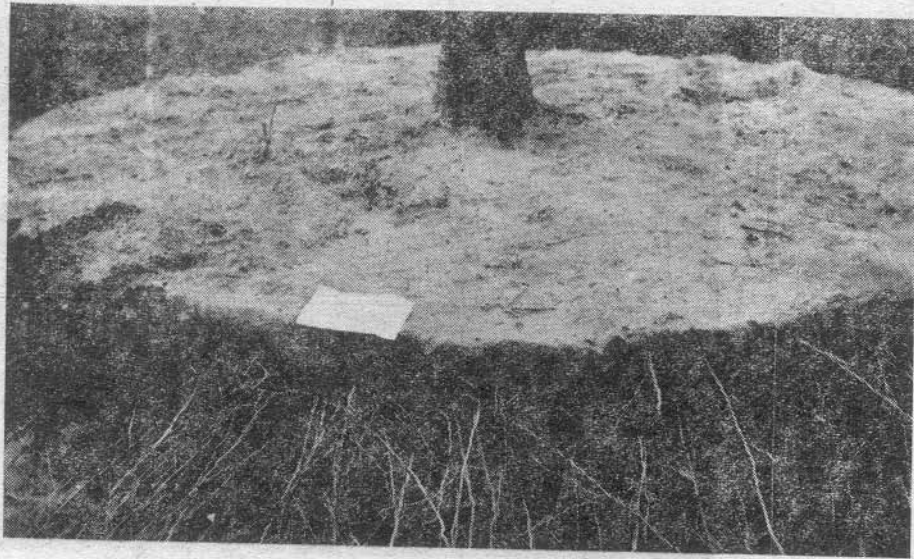


Fig. 2 Root system in the 3rd metre radial zone

by computing data collected from $\frac{1}{8}$ sector of the root system. According to Patel (1938) this method would lead to erratic estimate. Sampson (1923) had shown that secondary roots changed frequently as they were short lived which situation, it appears, had not been taken into account when root decay was estimated earlier. Selection of the main roots for the present study, was made on account of this observation. Proneness to submersion has been attributed to development of root decay in coconut. Varghese (1934) was of the opinion that roots do not decay because of the disease except when in contact with water. Observation of slight increase in the rate of root decay in palms in the first group where the roots were liable to prolonged submersion, corroborates this view. Absence of decay in the roots of palms that were artificially infected under controlled conditions (Shanta, Thomas Joseph and Lal, 1964) further underlined the insignificant role it has in the root

(wilt) syndrome. Present record that the root decay is hardly significant in the context of root (wilt) disease reaffirms these observations.

Earlier correlation of reduction in the ability of root regeneration with disease incidence would also have arisen out of collection of data from $\frac{1}{8}$ sector, because examination of the whole root system under the present study revealed lack of statistical significance for this character.

CONCLUSION

Extent of decay and regenerative ability of roots in root (wilt) diseased palms is comparable to that in healthy palms. This explains why root (wilt) diseased palms respond to application of nutrients in the soil and irrigation. Management practices for palms suffering from root (wilt) disease which is fortunately

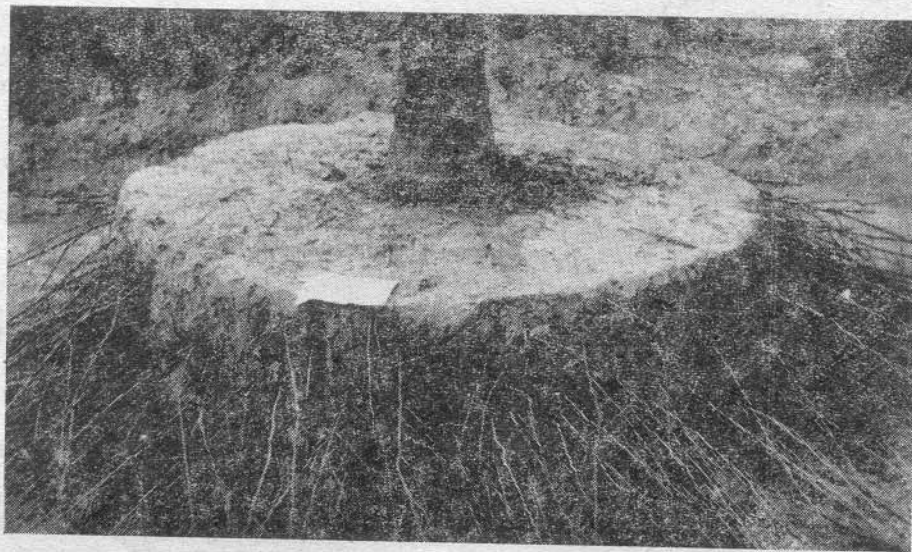


Fig. 3 Root system in the 2nd metre radial zone

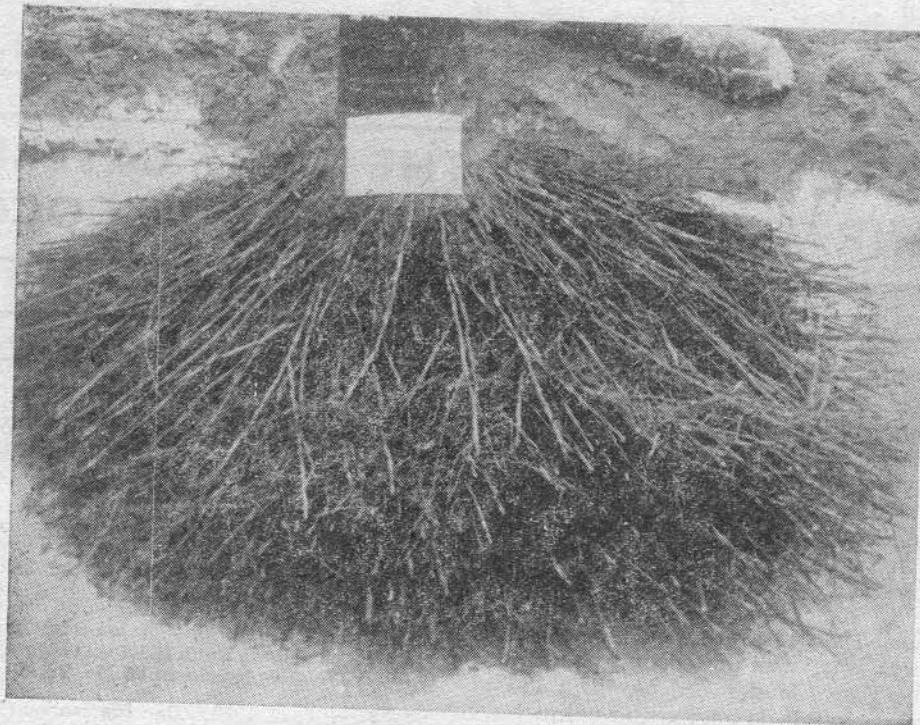


Fig. 4 Root system in the 1st metre radial zone

not lethal but only debilitating in the long run, a vital segment of the recommended strategy of "live with the disease", can now be taken up with better confidence than before, in order to maintain the palms, productive at economic level for several years in spite of the disease.

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TABLE I—Average of maximum number of roots of 18 coconut palms under different categories

Group	Condition of palms	Condition of roots			Total
		Healthy	Decayed	Regenerated	
1	Apparently healthy	2863.66 (67.10)	130.33 (3.05)	1273.66 (29.84)	4267.65
	Diseased (middle)	2314.66 (63.69)	281.00 (7.73)	1041.66 (28.64)	3637.32
	Diseased (advanced)	1733.00 (72.69)	65.66 (2.75)	586.63 (24.59)	2384.99
2	Apparently healthy	3201.32 (72.44)	60.66 (1.37)	1157.00 (26.16)	4418.98
	Diseased (middle)	2996.33 (86.13)	40.00 (1.15)	442.33 (12.72)	3478.66
	Diseased (Advanced)	2349.32 (75.85)	71.66 (2.31)	676.33 (21.84)	3097.31

Note:—Percentage given in brackets.