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Coconut root (wilt) disease in Trichur district 2. Observations on disease recurrence

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ABSTRACT

Four hundred coconut root [wilt] affected palms distributed in eight villages north of Karuvannur river in Trichur district Kerala were eradicated to prevent the spread of the disease further north. Observations on disease recurrence in the affected gardens were recorded periodically. Out of 209 gardens from where 400 root [wilt] disease affected palms were eradicated 193 gardens [92.4%] remained free of disease after four years. The gardens with disease recurrence are located in low lying areas of hill slopes and riverbed. Eradication is more effective in gardens where initial incidence of disease was low. Young palms are more susceptible to the disease. Within the diseased gardens spread of the disease was erratic.

INTRODUCTION

The mild incidence and scattered distribution of coconut root (wilt) disease was reported by Pillai *et al* (1973) in three villages north of Karuvannur river in Trichur district, Kerala. This mild incidence and the encouraging results of eradication of the sporadic diseased palms in Shencottah of Tamil Nadu and Nadathra of Trichur district led to the genesis of a Field Station to contain the disease with Karuvannur river and Amballur-Palappilly road (the protective belt established by the Keraia Agricultural Department) as boundary by survey and eradication of diseased palms on the northern side.

AREA OF OPERATION

The area of operation consisted of eight villages along the belt viz., Varandarappilly, Amballur, Kallur, Urakam, Arattupuzha Inchamudi, Kurumpilavu and Keezhppillikkara stretching from the foot hills of western ghats in the east to the backwater area in the west and one village Nadathra on the bank of Manali river (Fig. 1). These nine villages are broadly categorised as follows: (1) Varandarappilly, Amballur, Kallur and Nadathra having lateritic

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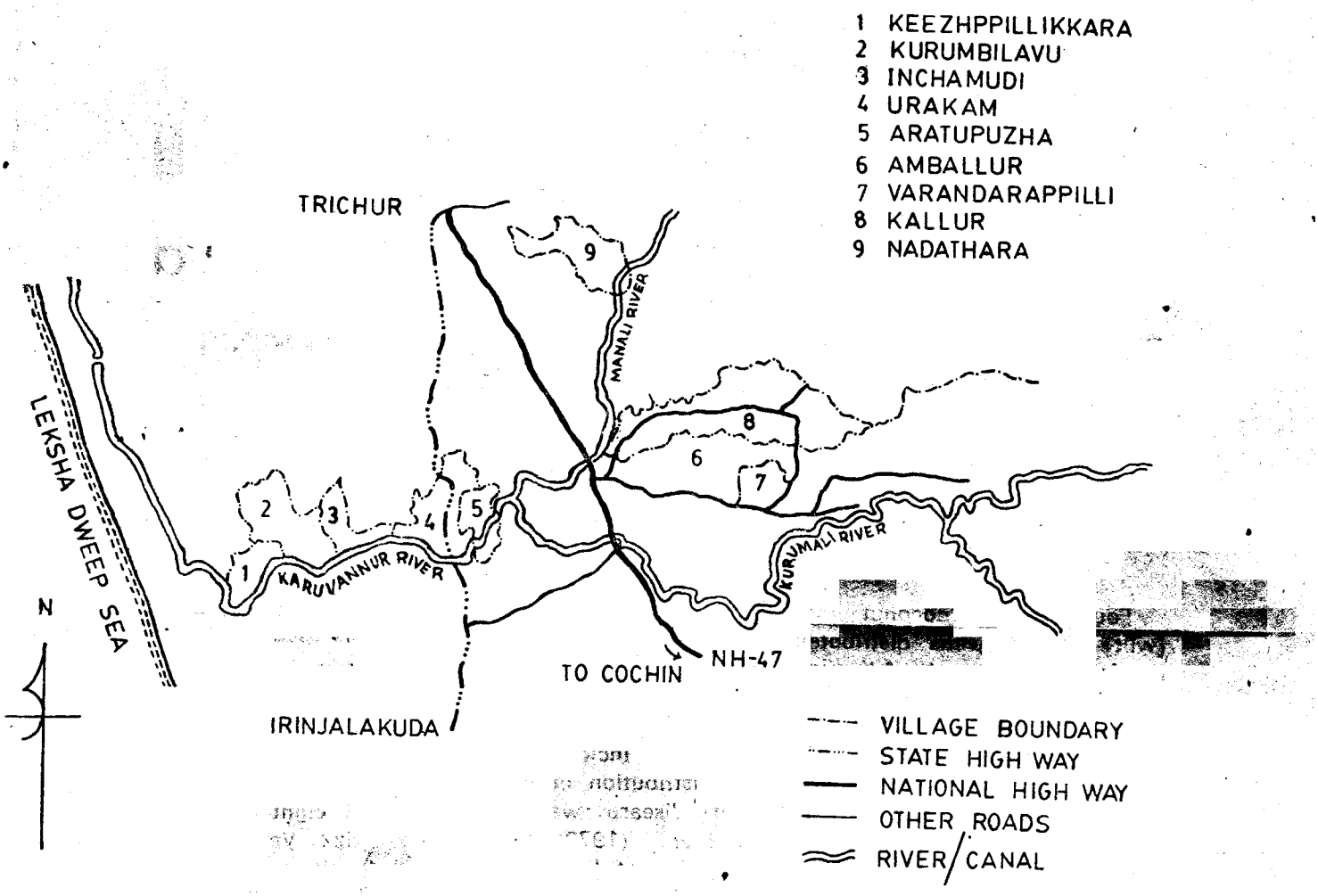
FIG.1, AREA OF OPERATION C.P.C.R.I. FIELD STATION, IRINJALAKUDA



soils, hilly undulating terrain, low water-table of 7.5 to 12m in summer, intercropped with arecanut, pepper, cocoa, banana, betelvine, mango and jack [2] Arattupuzha, Urakam, Inchamudi and Kurumpilavu having laterite soils mixed with loamy and alluvial soils, high water-table of 2.5 to 3.5 m subject to inundation during monsoon with few or no intercrops [3] Keezhppillikkara with monocrop of coconut intermittent by paddy fields in sandy / sandy loam soil subject to inundation.

SURVEY AND ERADICATION

Garden to garden survey conducted in nine villages in 1979-80 revealed the presence of 400 diseased palms in 209 gardens of eight villages [Rethinam *et al*, 1982]. These palms were got uprooted and their boles and roots were burnt in the same pit. Nadathra village was found to be free of the disease.

RECURRENCE OF DISEASE DISTRIBUTION

Disease recurrence was checked once in six months from the year of eradication. The data on initial disease incidence and recurrence after 3–4 years i. e. in the years 1982 and 1983 were taken into account for assessing the effect of eradication

and presented in Table 1. In 1982, recurrence was noticed on 34 palms in 21 gardens [10%] distributed in Varandarappilly, Amballur, Urakam and Kurumpilavu villages. Among them 13 gardens had recurrence after a gap of three years. Eighteen palms in 16 gardens [7.6%] of the above four villages and Arattupuzha, manifested disease symptoms in 1983, of which 11 gardens had the disease after a gap of four years, in 1983. Three gardens one each in Varandarappilly, Amballur and Urakam had repeated recurrence in 1982 and 1983.

Of the total of 34 gardens having disease recurrence, 27 gardens are scattered in Varandarappilly and Amballur as indicated palmwise in Fig. 2 [Amballur] and the rest along the river bank in Urakam and Kurumpilavu [Fig. 3 and 4].

RECURRENCE IN RELATION TO LOCATION OF GARDENS

[a] Proximity to diseased area :

Since Amballur-Palappilly road is maintained as border for Varandarappilly and Amballur villages and sizable number of root [wilt] affected palms prevail on the southern side of the road, the locations of the gardens from the road were grouped according to the distance from the road. The 150 gardens in these two villages were situated up to 3 km from the road. Recurrence was the highest [41.3%] in plots located at a distance of 1-2 km from the road indicating that specific conditions/factors related to slopes of hillocks and low lying situations might have influence on disease incidence.

[b] River and paddy field :

Of the total of 52 cases of disease recurrence, 28 were located within 30 metres from the paddy

FIG-2

DISTRIBUTION OF ROOT (WILT) DISEASED PALMS IN AMBALLUR

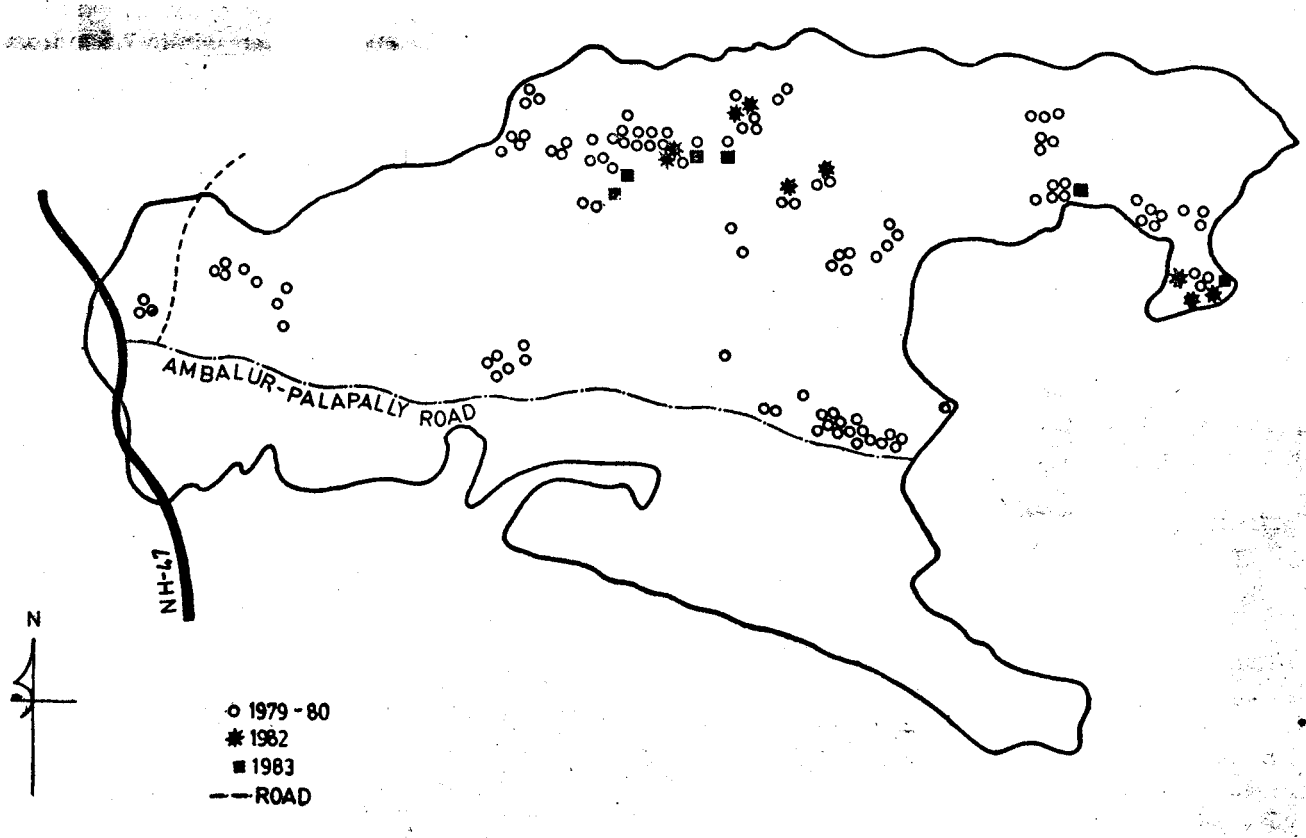
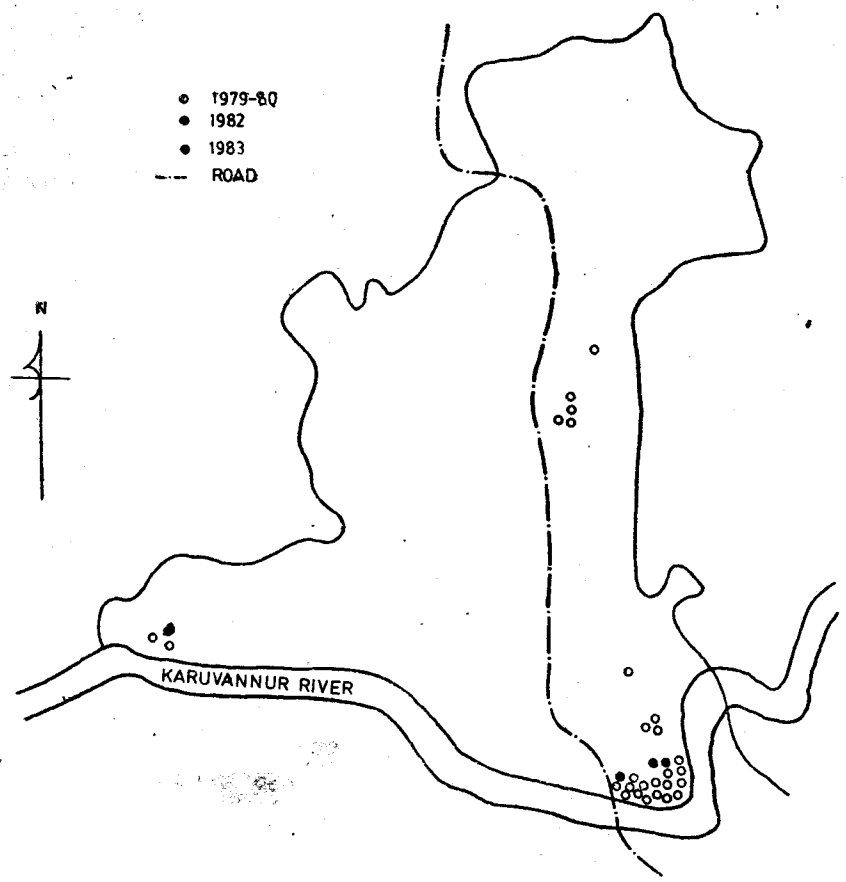


FIG. 3 DISTRIBUTION OF ROOT (WILT) DISEASED PALMS IN URAKAM



field, of which 11 were at the periphery of the paddy field. Fifteen palms were located at a distance of more than 30 metres from the paddy field. Another nine palms were situated on the banks of Karuvannur river.

RECURRENCE IN RELATION TO SOIL TYPE AND TERRAIN OF GARDEN

After the eradication of 316 diseased palms distributed in 155 gardens in laterite soils of Varandarappilly, Amballur and Kallur villages, the spread was noticed on 14 palms [4.4%] distributed in 12 gardens [8.0%] in 1983 whereas in light soils the disease manifested on 4 palms [5.3%] in 4 gardens [7.0%] after the initial eradication of 84 palms from 54 gardens.

Recurrence was noticed in 5.1% of the gardens [4/70] having level topography whereas it was 21.8% [23/105] in the gardens on hill slopes.

RECURRENCE IN RELATION TO POPULATION OF DISEASED PALMS

The recurrence in relation to population of diseased palms [Table 2] indicates that higher the diseased palms in the initial stage higher the recurrence. In the two gardens with more than 10 diseased palms initially, one garden had repeated recurrence throughout, while in the other disease recurrence was noticed after four years.

RECURRENCE IN RELATION TO AGE OF PALMS

About 50% of the palms which have contracted the disease were in the age group of 11–20 years coinciding with the initial occurrence in 1979-80 [Table 3]. Only four palms were above the age of 40 years.

RECURRENCE IN RELATION TO FOCUS OF INFECTION

Only seven cases of disease recurrence were within 7.5 m from the focus of infection while the remaining 45 palms were distributed within 45 m from the original focus indicating erratic spread. One TxD seedling replanted in the same pit six months after eradication was found to have contracted the disease after 3 years.

DISCUSSION

Eradication of coconut root [wilt] disease affected palms controls the further development of the disease as has been brought out from the data in Table 1. Out of 209 coconut gardens from where 400 root [wilt] affected palms were eradicated in 1979-'80, 92.4 per cent of gardens remained free of disease after 4 years. The prompt and systematic eradication of diseased palms thus

helps in "containing the disease".

The pattern of recurrence of disease suggests that low lying areas, slopes of hillocks and riverbanks are more favourable situations for disease development as has already been reported [Menon and Nair 1949; Pillai *et al*, 1973]. Similarly, the erractic incidence of disease and susceptibility of young palms to the disease are in conformity with the observations of Pillai *et al* [1973, 1980] and Ramadasan *et al* [1971].

For a contagious disease, elimination of the focus is a natural control measure and the abundance of inoculum influences the recurrence. In general, the data presented here support these principles. However, variations in the pattern of disease recurrence recorded in some of the gardens need more critical observations. For example, repeated and continuous recurrence of disease was noticed in a garden having 14 diseased palms originally while there was no recurrence for a period of three years in a garden having the same number of diseased palms. Repeated recurrence noticed in gardens with lower population of diseased palms also suggests that factors other than availability of the source of disease, play a major role in the development of disease. An understanding of localised specific conditions leading to persistence of disease in 34 gardens out of the 209 gardens will be worth investigating.

FIG. 4 DISTRIBUTION OF ROOT (WILT) DISEASED PALMS IN KURUMPILAVU

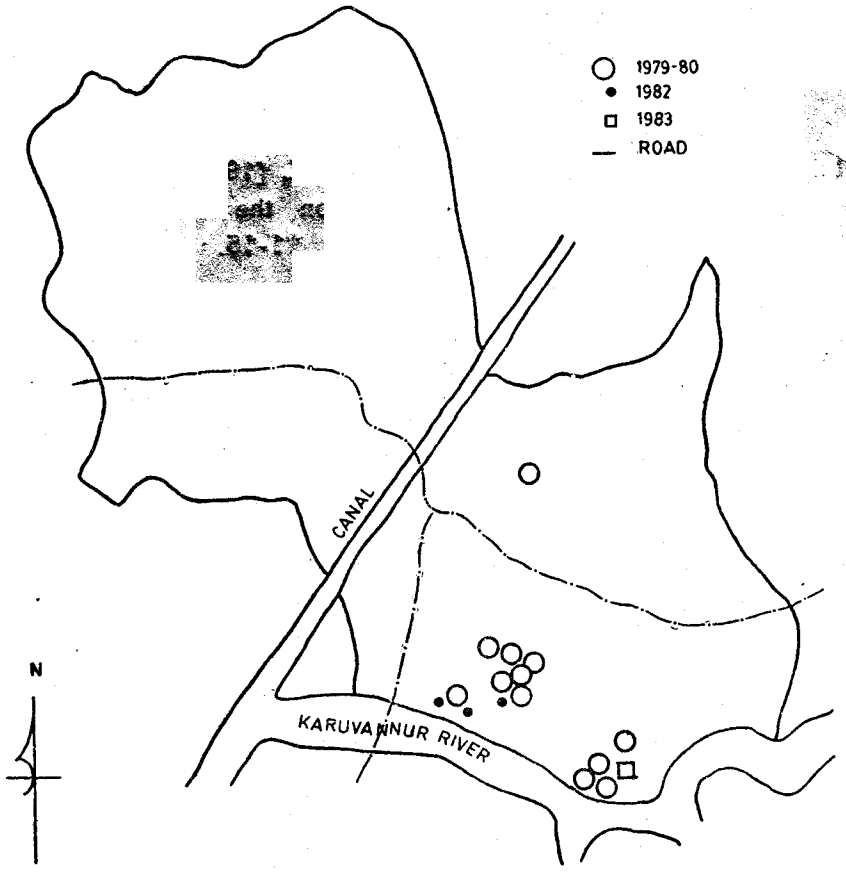


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Table 1.

Disease incidence and recurrence in the belt area

Village	Incidence in 1979-80		Recurrence in 1982		Recurrence in 1983	
	Gardens	Palms	Gardens	Palms	Gardens	Palms
Varandarappilly	83	196	11	20	7*	8
Amballur	67	110	6	9	5*	6
Kallur	5	10	—	—	—	—
Arattupuzha	8	16	—	—	1	1
Urakam	17	28	2	2	2*	2
Inchamudi	2	3	—	—	—	—
Kurumpilavu	9	12	2	3	1	1
Keezhppillikkara	18	25	—	—	—	—
Total	209	400	21	34	16	18

* One garden with recurrence in 1982

Table 2

Recurrence in relation to population of diseased palms

Year	Number of gardens with initial number of diseased palms						Total
	1	2	3	4	5–10	more than 10	
1979-'80	121	45	22	9	10	2	209
1982	8	4	4	—	4	1	21
1983	7**	3	1	2	1	2*	16
Percentage recurrence up to 1983	10.7	15.5	22.7	22.2	50.0	100.0	

* Includes one garden with recurrence in 1982

** Includes two gardens with recurrence in 1982

Table 3

Disease incidence and recurrence in relation to age of palms

Year	Number of palms in the age group of					Total
	1-10yrs	11-20yrs	21-30yrs	31-40yrs	41yrs & above	
1979-'80	68	138	115	52	27	400
1982	8	15	4	3	4	34
1983	4	9	4	1	—	18