

ORIGIN, DISTRIBUTION AND PRODUCTION LOSS

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Root (wilt) disease of coconut has been known to be present in South Kerala (India) since 1882 (Butler, 1908; Varghese, 1934). Butler referred to it as 'root disease' probably due to the rotting of roots noticed by him in the affected palms. Nagaraj and Menon (1955) felt that the name 'wilt' would be a more appropriate term for the malady taking into account the nature of foliar symptoms and subsequently, the disease came to be known as root (wilt) disease (Shanta *et al.* 1960; Mathen *et al.* 1983).

The root (wilt) disease was first reported from Erattupetta area of Meenachil Taluk in Kottayam District (Butler, 1908; Pillai, 1911). It was believed to have been significantly manifested since the great floods of 1882 (Menon and Pandalai, 1958). Around 1907, the malady was reported from Kaviyoor and Kalloppara areas of Thiruvalla Taluk and later from Kayangulam of Karthikappally Taluk (Butler, 1908; Varghese, 1934; Menon and Pandalai, 1958) (Fig. 1). The disease which appeared more or less simultaneously in the above foci began to spread to adjoining areas also (Varghese, 1934). An attempt to determine the extent of spread of the disease was made by Butler (1908) and Pillai (1911). Their studies indicated that the disease affected about 24,000 ha of coconut plantations in Meenachil, Thiruvalla, Kayangulam and Alappuzha. Later, Varghese (1934) traced the occurrence of the

disease upto Kochi in the north and Kottarakara in the South. Isolated pockets of infection were also reported by him in and around Adoor, Mavelikara, Kochi and Moovattupuzha. Rapid spread of the disease along the banks of Meenachil, Manimala, Pamba and Kallada rivers was also indicated. Menon and Nair (1951) in a survey conducted during the period 1937-48 identified the areas bordered by Kollam in the south west, Panalur in the south east, Ochanthuruthu in the north west and Malayattur in the north east as affected by root (wilt) disease. Very heavy incidence was also recorded in places around Kayangulam, Alappuzha, Thiruvalla, Mattancherry and Ernakulam. Varghese (1959) in a reconnaissance survey located pockets of disease incidence in areas beyond Kollam in a few villages east of Attingal on the bank of Vamanapuram river. Pillai *et al.* (1973) reported a contiguous distribution of the disease in six districts viz. Thiruvananthapuram, Kollam, Alappuzha, Kottayam, Ernakulam and Thrissur of Kerala State. The limits of spread of the disease was reported to be Ala, Varandarappally and Kalloor in Thrissur District in the north and Nemom, Ottasekharamangalam and Maranallur of Thiruvananthapuram District in the South. According to them more than 30 per cent of the 7,50,000 ha under coconut in Kerala was affected by the disease. Sporadic occurrence of the malady was also recorded in the districts of Tirunelveli and Kanyakumari of

COCONUT ROOT (WILT) DISEASE

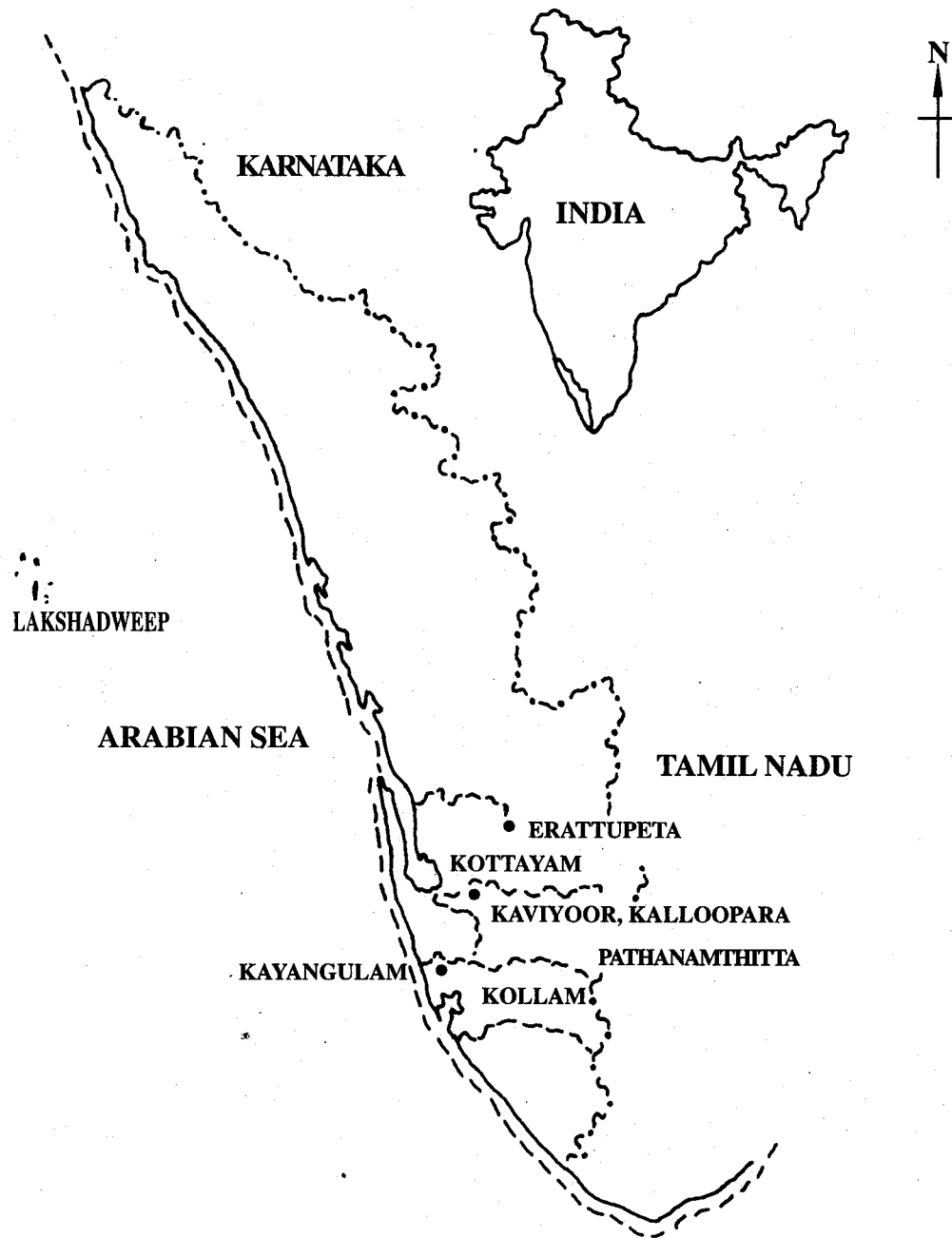


Fig. 1 Foci of initial occurrence of root (wilt) disease (indicated by ●)

Tamil Nadu State lying adjacent to South Kerala (Subba Raja and Ahamed, 1976). Among the disease affected tracts in Kerala State, Karunagappally, Kuttanad, Kanjirappally, Meenachil and Kanayannur Taluks were considered to be disease endemic areas.

George *et al.*, (1979) conducted a survey during the six year period (1971-76) in the districts of Thrissur, Ernakulam, Idukki, Kottayam, Alappuzha, Kollam and Thiruvananthapuram in order to study *inter alia* the incidence of root (wilt) disease. Their survey brought out that the disease incidence was maximum (54.6%) in Alappuzha District followed by Kottayam (49.8%) and Idukki (43.0%) Districts. In Ernakulam and Kollam Districts the disease incidence was 26 and 27 per cent, respectively. Thrissur and Thiruvananthapuram Districts had very low percentage of disease incidence.

Pillai *et al.*, (1980) indicated that the disease was prevalent in all the major soil types in Kerala State. However, the spread of the disease was observed to be fast in light textured sandy loam and alluvial soils as well as heavy textured clayey soils than in the laterites. The incidence was relatively higher in water-logged low lying areas adjacent to rivers and canals and in 'Kari' soils.

A comprehensive survey was undertaken by the Central Plantation Crops Research institute (CPCRI) in collaboration with the Department of Agriculture, Kerala and other agencies in 1984/85 to estimate the spread and intensity of disease and production loss due to the malady (Anon., 1985). The survey brought out that the disease

was prevalent in more or less contiguous manner in 4,10,000 ha in the eight southern districts of Kerala. The intensity of the disease in both bearing and non-bearing categories of palms was highest in Kottayam district (75.6%) followed by Alappuzha (70.7%), Pathanamthitta (38.2%), Ernakulam (34.5%), Idukki (34.2%) and Kollam (28.6%). In the districts of Thrissur and Thiruvananthapuram the percentage of disease incidence was 2.6 and 1.5, respectively (Table 1).

The survey also revealed the sparse occurrence of the disease in some isolated pockets in the northern parts of Kerala far away from the contiguously diseased area (Fig. 2) and also in the adjoining districts of Tamil Nadu.

Department of Agriculture, Govt. of Kerala had undertaken a detailed survey in 1996 in the eight southern districts (Anon., 1997). It was a complete garden to garden survey of all the panchayath and municipal areas in the two border districts of Thiruvananthapuram and Thrissur, while for the other six districts, only 10% of the panchayaths were covered under the survey. The results of this survey revealed that the over-all disease incidence has come down to 24.05% (Table 2). Compared to the 1984-85 situation, the reduction in incidence was substantial in Alappuzha and Kottayam districts, while in Thrissur district, the disease has spread to more areas. The decline in overall disease incidence is attributed to cutting and removal of diseased palms (with assistance from Coconut Development Board), replanting with quality seedlings, adoption of integrated management practices and replacement of coconut with rubber.

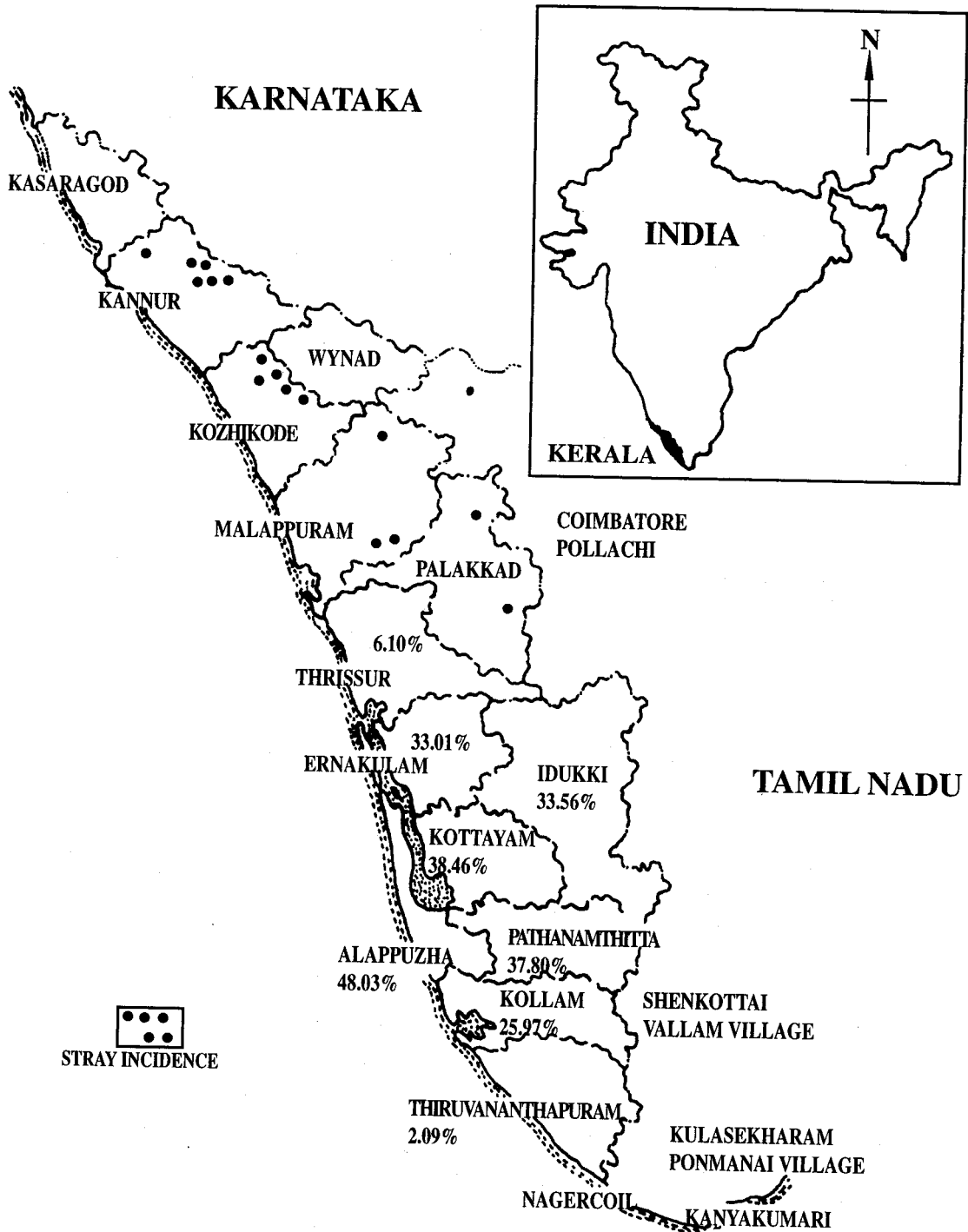


Fig. 2 Distribution of coconut root (wilt) disease in Kerala (1997)

Table 1. Percentage of palms under various categories of disease (Anon., 1985)

Sl. No.	District	Non-bearing palms			Bearing palms			Overall diseased
		DE	DA	Tot. dis	DE	DA	Tot. dis	
1.	Thiruvananthapuram	0.22	0.09	0.31	1.88	0.58	2.46	1.52
2.	Kollam	13.49	3.48	16.97	22.68	0.19	31.87	28.55
3.	Pathanamthitta	12.90	5.84	18.74	29.53	25.59	55.12	38.22
4.	Alappuzha	29.75	10.61	40.36	56.77	23.39	80.16	70.69
5.	Kottayam	37.38	9.43	46.81	61.56	24.00	85.56	75.63
6.	Idukki	4.69	0.41	5.10	27.01	8.29	35.30	34.18
7.	Ernakulam	19.64	1.75	21.39	39.91	8.66	48.57	34.52
8.	Thrissur	0.42	0.16	0.58	3.75	0.86	4.61	2.60
Overall		13.50	3.26	16.76	29.54	11.36	40.90	32.37

DE - Disease Early; DA - Disease Advanced

Table 2. Coconut root (wilt) disease incidence - District-wise details (Anon., 1997)

Sl. No.	Particulars	TVM	KLM	PTA	ALPY	KTM	IDK	EKM	TCR	Total
1.	Total No. of root (wilt) free palms ('000 Nos.)	20464	9306	3949	7372	5416	4135	10258	16560	77460
2.	Total No. of disease early palms ('000 Nos.)	252	1970	1621	4756	2406	1264	3594	687	16550
3.	Total No. of disease advanced palms ('000 Nos.)	185	1294	779	2057	980	825	1461	407	7988
4.	Total No. of Palms ('000 Nos.)	20901	12570	6349	14185	8802	6224	15313	17654	101998
5.	Percentage of disease incidence	2.09	25.97	37.80	48.03	38.46	33.56	33.01	6.10	24.05

George *et al.* (1979) estimated the annual loss due to the disease as 340 million nuts while the subsequent comprehensive survey (Anon., 1985) revealed that the loss has increased to 968 million nuts. The district-wise split up of production loss due to the disease as per the latter survey is given in Table 3.

Table 3. Estimated production loss due to root (wilt) disease in different districts of Kerala (Anon., 1985)

Sl. No.	District	Production loss (in million nuts)
1.	Thiruvananthapuram	11.34
2.	Kollam	110.56
3.	Pathanamthitta	99.39
4.	Alappuzha	271.02
5.	Kottayam	254.39
6.	Idukki	31.11
7.	Ernakulam	177.13
8.	Thrissur	12.65
Total		967.59

The survey conducted in 1984-85 also brought out that the loss in husk per nut of the diseased palm was around 25.8 per cent and that of copra and oil per nut was 9.0 and 11.3 per cent respectively. The loss in yield of nuts and leaves is to the tune of 60 per cent.

Separate studies have also been undertaken to estimate the decline in yield due to the incidence of root (wilt) disease. Abraham *et al.* (1987) obtained a significant negative correlation between yield and disease index of affected palms. Jacob Mathew *et al.* (1993) observed in disease affected palms a general yield decline of about 45% in W.C. Tall and about 60% in D x T hybrids, compared to the healthy ones under good management. In palms which contracted the disease in early stages, the loss was still higher. The onset of bearing was also found to be delayed in palms which become diseased in the pre-bearing stage.

It may be seen that the root (wilt) disease is mostly confined to the eight southern districts of Kerala. The strategy developed by CPCRI to contain the disease within this tract and prevent its further spread to northern districts of Kerala and border districts of Tamil Nadu has been encouraging. At present there is no information on hand about the source of infection in isolated pockets of the northern districts of Kerala and in some areas of Tamil Nadu. Periodic survey for identification of fresh incidence of disease in the areas bordering these eight districts and eradication of such palms is felt desirable.

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