

# Distribution of Phytoparasitic Nematodes on Arecanut in South India

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## Abstract

*Extensive surveys of arecanut growing areas of Kerala, Karnataka and Tamil Nadu were conducted during 1976 to 1980. A total of 822 each of soil and root samples were collected from healthy and Yellow Leaf Disease affected arecanut gardens. Twenty eight genera of plant parasitic nematodes were isolated from the root zone of arecanut. The burrowing nematode, Radopholus similis was obtained from maximum number of root samples. Rotylenchulus reniformis, Helicotylenchus dihystra, Hemicriconemoides mangiferae, Caloosia longicaudata and Hoplolaimus seinhorsti were the most widely distributed ectoparasitic forms in the soil samples of arecanut growing areas in South India.*

## Introduction

In India, arecanut (*Areca catechu* L.) is grown in about 1.8 lakh ha and 63 per cent of the total area under cultivation is in Kerala and Karnataka. The Yellow Leaf Disease (YLD) remains today as the most serious problem facing arecanut growers. The malady is prevalent in different intensities in Kerala and Karnataka states. The association of nematodes with arecanut was first reported by Nair in 1964. Later Weischer (1967) and Kumar et al., (1971) recorded the presence of seven and five genera of plant parasitic nematodes from soil samples of arecanut palms. Koshy et al., (1976 and 1978) recorded the wide spread occurrence of *Radopholus similis* (Cobb, 1893) Thorne, 1949 in South India. Results of an attempt made to study

the distribution of phytoparasitic nematodes in soil samples collected during a survey are reported herein.

## Materials and Methods

The route of survey was mostly along the main roads and samples were collected from nearby gardens after every 10 km. A total of 822 each of soil and root samples were collected from healthy and YLD affected arecanut gardens in Kerala Karnataka and Tamil Nadu. Soil samples were collected 75 cm away from the bole of the palm at a depth of 10 - 50 cm with a soil augor. Three such samples were taken within the basin at 120° to each other, mixed well and an aliquot of 250 ml sample was drawn. The extraction was done by Cobb's modified sieving and decanting technique. Nematodes of each sample were killed and preserved in 2 per cent formaldehyde.

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**Table 1.** Distribution and frequency of occurrence (%) of phytonematodes recovered from soil samples

Sl. No.	Genera / species	Kerala	Karnataka	Tamil Nadu
1.	<i>Aphelenchoides</i> sp.	13	3	7
2.	<i>Aphelenchus</i> ( <i>Anaphelenchus</i> ) <i>isomerus</i> (Anderson & Hooper, 1980)	13	4	—
3.	<i>Boleodorus</i> sp.	∠ 1	—	—
4.	<i>Brachydorus swarupi</i> (Koshy, Raski & Sosamma, 1981)	1	—	—
5.	<i>Caloosia longicaudata</i> (Loos, 1948; Siddiqi & Goodey, 1964)	22	20	20
6.	<i>Criconemoides</i> sp.	8	∠ 1	—
7.	<i>Ditylenchus</i> sp.	2	—	—
8.	<i>Ecphyadophora teres</i> (Raski, Koshy & Sosamma, 1982)	3	2	7
9.	<i>Epicharinema keralensis</i> (Raski, Maggenti, Koshy & Sosamma, 1980)	5	—	—
10.	<i>Helicotylenchus dihystra</i> (Cobb, 1893; Sher, 1961)	53	40	53
11.	<i>Hemicriconemoides mangiferae</i> (Siddiqi, 1961)	20	31	27
12.	<i>Hoplolaimus seinhorsti</i> (Luc, 1958)	22	19	33
13.	<i>Longidorus saginus</i> (Khan, Seshadri, Weischer and Mathen, 1971)	3	3	—
14.	<i>Malenchus</i> sp.	∠ 1	—	—
15.	<i>Meloidogyne</i> sp.	19	21	13
16.	<i>Paralongidorus</i> sp.	∠ 1	—	—
17.	<i>Paratylenchus</i> sp.	5	9	7
18.	<i>Pratylenchus</i> sp.	3	2	13
19.	<i>Psilenchus</i> sp.	∠ 1	—	—
20.	<i>Radopholus similis</i> (Cobb, 1893; Thorne, 1949)	40	21	20
21.	<i>Rotylenchulus reniformis</i> (Linford & O'Hiveria, 1940)	59	49	33
22.	<i>Rotylenchus</i> sp.	∠ 1	—	—
23.	<i>Scutellonema</i> sp.	∠ 1	—	—
24.	<i>Trichodorus</i> sp.	8	3	—
25.	<i>Trophurus</i> sp.	∠ 1	2	—
26.	<i>Tylenchorhynchus coffeae</i> (Siddiqi & Basir, 1959)	28	11	7
27.	<i>Tylenchus</i> sp.	5	15	13
28.	<i>Xiphinema inaequale</i> (Khan & Ahmed, 1976) (Syn. <i>X. neoamericanum</i> Khan & Ahmed, 1975)	19	5	—

Nematode populations were assessed in 435 out of 822 soil samples collected during the survey.

## Results and Discussion

Of a total of 435 soil samples assessed, 314 were from Kerala, 106 from Karnataka and 15 from Tamil Nadu. Twenty eight genera of plant parasitic nematodes were recorded. The frequency of occurrence of plant parasitic nematodes is given in Table 1. *Rotylenchulus reniformis* was obtained with largest number (4800/250 ml) in 66 per cent of samples analysed. It is seen from Table 1 that the following phytone-matodes viz., *R. reniformis*, *H. dihystra*, *R. similis*, *H. mangiferae*, *C. longicaudata* and

*H. seinhorsti* were recorded from maximum number of soil samples from all the three states. The frequency of occurrence of these nematodes in the root zone of healthy and YLD affected arecanut gardens is given in Table 2.

Amongst the nematode fauna isolated from diseased as well as healthy palms *R. similis* was given the major attention because of the well known role of this nematode in other crop diseases, particularly in citrus and banana (O'Bannon, 1977).

The pathogenicity studies conducted earlier with *R. similis* recorded as high as 52 per cent reduction in plant growth over a period of three years under pot conditions (Koshy and Sundararaju, 1981) which has convincingly proved the pathogenicity of the nematode on arecanut palms. However, its exact role, if any, in the Yellow Leaf Disease complex remains still to be resolved. This brings out the need of studying the role of nematodes in association with other micro-organisms.

**Table 2. Frequency of occurrence of various nematodes in root zone of areca palms.**

Nematode species	Frequency of occurrence	
	Healthy gardens*	Diseased gardens**
<i>Rotylenchulus reniformis</i>	63	189
<i>Helicotylenchus dihystra</i>	58	189
<i>Hemicriconemoides mangiferae</i>	21	80
<i>Caloosia longicaudata</i>	25	68
<i>Hoplolaimus seinhorsti</i>	23	62
<i>Radopholus similis</i>	34	157

\* Total no. of Samples - 120

\*\* Total no. of Samples - 315

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