

Frequency of Occurrence and Intensity of Yellow Leaf Disease of Arecanut (*Areca catechu* L.) in Relation to Water Table

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Abstract

Among the diseases affecting areca palm (Areca catechu L.), yellow leaf disease is one of the most important diseases based on the nature of the disease and extent of damage. Its etiology is unknown.

During the present survey, 18 per cent of the palms in Trichur district (Kerala State) were found to be affected by the disease. The severity of the disease varied. In areas where the water table was above 1.5m, the disease was noticed in 20 per cent of the palms. In areas where the water table was 1.5 to 3m below ground level the disease was observed in 20 per cent of the palms and only in 12 per cent of the palms where the water table was below 3 m. Log-likelihood ratio test conducted to examine the relationship between water table and disease incidence showed that the disease incidence was not independent of water table.

Introduction

Yellow leaf disease (YLD) was first reported from Moovattupuzha and Meenachal taluks of Kerala State in 1914 (Nambiar, 1949). Since then it has been recorded from different parts of Kerala, coastal regions of Maharashtra, parts of Karnataka and Tamil Nadu. The etiology of the disease is yet to be established. Detailed studies on the role of fungi, bacteria, nematodes, virus, mycoplasma-like-organisms and nutritional disorders did not give any clear indication on the etiology of the disease. The probable role of water logging, acidity and nutritional disorders in the disease incidence has been reported by many workers

(Dastagir, 1963; Velappan, 1969 and Mohapatra et al., 1976). Though intensity of this disease was noticed to be more in low lying areas, detailed studies have not been conducted to find out the relationship between water table and disease incidence. This study was aimed at understanding this relationship.

Materials and Methods

The study was taken up during 1976. To estimate the intensity and spread of YLD in Trichur district, Kerala State a survey was conducted during October-November during which time the symptoms become distinct. A total of 42 villages belonging to Trichur, Thalappally and Mukundapuram taluks were surveyed. From each village five survey numbers where arecanut was cultivated were selected at random. Data pertaining to

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water table, total number of healthy and diseased palms and intensity of the disease were recorded from the selected plots. The water table of each garden was recorded by measuring the water level in the well in each garden. The disease index was determined. The palms in each garden were grouped into healthy, diseased early, diseased middle and diseased severe based on visual scoring. The palms observed were further grouped depending on depth of water table viz., above 1.5 m, 1.5 - 3.0m and below 3.0m water table.

The palms observed in each village were considered on hectare basis per village for statistical analysis, with a view to finding out the dependency of intensity of disease incidence on water table. Log-likelihood ratio test was carried out using the following expression (Zar, 1974).

$$G = 2 \left[\sum \sum_{ij} f_{ij} \log_e f_{ij} - \sum R_i \log_e R_i - \sum C_j \log_e C_j + n \log_e n \right]$$

Where: f_{ij} = Palms in the i th row and j th column

R_i = total palms in the i th row

C_j = total palms in the j th column

n = total number of palms

(G is distributed approximately to χ^2 with $(r - 1)(C - 1)$ d.f.)

Results and Discussion

The occurrence of YLD of arecanut was observed to be of varying intensities in Trichur, Mukundapuram and Thalapally taluks in Trichur district. Over 50 per cent of the total villages were found to be affected. A total of 40,061 palms were observed during this survey. Eighteen per cent of the observed palms were found

to be affected. The occurrence and intensity of the disease in relation to water table are given in Table 1. In areas, where the water table was above 1.5m the disease was noticed in 20 per cent of the palms with 11 per cent in the early, 7 per cent in the middle and 2 per cent in the severe stage of intensity. The disease incidence in areas where the water table was 1.5 - 3.0m below ground level, was also 20 per cent with 10, 8 and 2 per cent of the palms in diseased early, middle and severe stage of intensity, respectively. But only 12 per cent of the palms were found to be affected in localities with water table below 3.0m.

Log - likelihood ratio test showed a significant relationship between water table and disease incidence ($G=19.9^{**}$ at $P=0.05$). Thus, it has been found that the incidence of YLD is not independent of water table and incidence was more in areas of high water table. Water logging was considered as one of the pre-disposing factors in the incidence of the disease (Pal et al., 1960). Mathai (1976) has also observed that waterlogging in affected gardens were generally high with 10 - 20cm standing water during the period of

Table 1. Percentage of yellow leaf disease affected palms under different water table and intensity

Disease severity	%of palms		
	Water table (from ground level)		
	upto 1.5m	1.5 - 3.0m	Below 3.0m
Healthy	80	80	88
Diseased early	11	10	6
Diseased middle	7	8	5
Diseased severe	2	2	1

symptom appearance. Mohapatra et al., (1976) observed that water table in affected gardens was within the root zone of areca palms and in Karnataka state, yellow leaf disease was generally seen in areas of high water table. The present studies

also showed that the incidence was more in areas with high water table. Therefore, water table may be considered as one of the important factors while investigating the predisposing factors in the occurrence of yellow leaf disease.

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