

INCIDENCE OF STEM BLEEDING DISEASE OF COCONUT PALM IN RELATION TO PH AND ELECTRICAL CONDUCTIVITY OF SOILS

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ABSTRACT

Soil reaction (pH) and electrical conductivity were determined in soil samples collected from 16 stem bleeding affected areas belonging to Kerala, Tamil Nadu, Karnataka, and Goa. They were not directly related to the incidence of stem bleeding disease of coconut palm.

INTRODUCTION

The incidence of stem bleeding disease of coconut has been reported from several areas and countries (Petch, 1906; Sundaraman, 1922; Lee, 1922; Sharples, 1923; Thompson, 1924; Mitra, 1929; Briton Jones, 1940). The 'anabe roga' disease prevalent in Karnataka, India and caused by *Ganoderma lucidum* is associated with bleeding of the stem (Narasimhan, 1930). In Sri Lanka stem bleeding has been attributed to physiological factors (Salgado, 1942).

In India, stem bleeding disease occurs under varying soil conditions in all the coconut growing States. The characteristic symptom of the malady is the exudation of a dark brown fluid from the trunk. Usually, it starts from the basal portion of the trunk and progresses gradually upwards (Menon and Pandalai, 1960). The tissues beneath the oozing patches appear decayed and yellowish.

Earlier studies carried out at this Station revealed that high salt content at the rhizosphere and tissues was associated with the disease (Anonymous, 1970). Heavy application of chemical fertilizers in a single dose after cutting a sector of roots during times of low rainfall could induce stem bleeding in a few palms (Anonymous, 1971). We could not see any significant difference in the major nutrient content between healthy and affected gardens of Kerala. In the light of these observations, pH and electrical conductivity of soils of healthy and affected gardens were studied since EC of soil is an indirect measure of water soluble salts.

MATERIALS AND METHODS

Soil samples were collected from disease affected area from five sites each in Tamil Nadu and Goa, four sites in Kerala, and two sites in Karnataka. In each site, five affected

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and five healthy palms were selected. Soil samples were collected from the basins of these palms, one metre away from the bole from two depths, 0-50 and 50-100 cm. The soil samples were collected at half yearly intervals for two years. Samples were air-dried and sieved through a 2 mm sieve and were tested for pH and EC. pH was determined in 1:2.5 soil-water suspension using Beckman pH meter. Electrical conductivity was determined in the same solution after filtration using Mullard conductivity bridge.

RESULTS AND DISCUSSION

The results of the analysis of soil samples (Table I) showed that the EC was less than one millimhos in samples collected from both healthy and disease affected gardens. The EC was significantly more in the soils

of healthy garden than in the soils from the diseased garden in Kumarakom (Kerala) and Uchipuli (Tamil Nadu). In the other 14 places no significant difference in EC was noticed. Govinda Iyer et al. (1962) reported that even at a pH value of 8 and EC value of 0.5 millimhos, the soil gave normal growth of annual crops and when the EC value was more for the same pH, the field was barren. Considering the low values obtained for EC of soil samples from all the areas studied, particularly of soils from disease affected gardens and the perennial nature of the crop, it is doubtful that soluble salt concentration in the soil upto a depth of 100 cm creates any problems for the normal growth of coconut palms.

The pH values of soils (Table II) showed that even though they varied among locations, no appreciable difference between healthy and diseased area could be noticed.

Table I. *Electrical conductivity (millimhos/cm.) of healthy and stem bleeding affected soils*

Places	Healthy	Diseased	Depth (cm)		Mean
			0-50	50-100	
Kandalloor (Kerala)	0.10	0.10	0.06	0.13	0.10
Kumarakom "	0.83	0.50	0.31	1.00	0.66
Nileshwar "	0.19	0.10	0.17	0.11	0.14
Kasaragod "	0.26	0.25	0.34	0.16	0.25
Uchipuli (Tamil Nadu)	0.37	0.10	0.32	0.16	0.24
Uchipuli Farm "	0.04	0.04	0.05	0.04	0.04
Vadacadu "	0.04	0.04	0.04	0.04	0.04
Melakadu "	0.03	0.05	0.04	0.04	0.04
Keelakadu "	0.05	0.06	0.06	0.05	0.05
Benaulim (Goa)	0.03	0.05	0.03	0.04	0.04
Batalvatim "	0.09	0.07	0.08	0.08	0.08
Taleigao "	0.04	0.05	0.05	0.04	0.05
Anjuna "	0.06	0.06	0.06	0.06	0.06
Calangute "	0.05	0.06	0.06	0.06	0.05
Arsikere (Karnataka)	0.14	0.12	0.10	0.16	0.13
Chitradurga "	0.37	0.34	0.36	0.35	0.36
Mean	0.17	0.12	0.13	0.16	0.15

SE per plot 0.23. CD (5% level) Places 0.07, Places \times Healthy vs Diseased 0.11, Places \times depth 0.11.

Table II. *pH values of healthy and stem bleeding affected soils*

Location	Healthy		Diseased	
	Depth in cm		Depth in cm	
	0-50	50-100	0-50	50-100
Kerala	4.2-7.7	4.0-7.0	4.2-7.8	4.0-8.2
Tamil Nadu	5.6-9.6	4.1-9.7	4.4-9.1	4.1-9.3
Goa	4.1-9.5	4.3-7.7	5.1-8.2	4.7-8.5
Karnataka	7.0-8.4	7.1-9.0	6.9-8.8	7.4-8.8

Since coconut palm is adaptable to a wide range of soil reaction (Menon and Pandalai, 1960) and in the light of low values of EC the fluctuations in pH do not appear to be responsible for the incidence of stem bleeding disease of coconut palm.

From the present study it is inferred that pH and EC are not directly related to the incidence of the stem bleeding disease of coconut palm.

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