

Short Scientific Reports

Non-association of Phytopathogenic Bacteria with Yellow Leaf Disease of Arecanut Palm

The yellow leaf disease (YLD) of arecanut (*Areca catechu* L.) remains today as the most serious problem facing the areca growers in several parts of Kerala and Karnataka states. Fungi isolated from leaves and roots of the diseased palms could not be implicated with the disease (Anonymous, 1963). Attempts to isolate bacteria yielded species of *Bacillus*, *Pseudomonas*, *Xanthomonas* and *Serratia* and the pathogenicity of the isolates could not be proved (Anonymous, 1964). Bacterial streaming was reported in YLD affected roots (Srivastava, Rao and Mohan, 1970; Anonymous, 1975). In the present study, the results of intensified investigations on the bacterial involvement in YLD of arecanut are reported.

The root and leaf samples were collected from the following disease affected areas during 1979-80: Aranthodu, (Sullia) of Dakshina Kannada district in Karnataka (once in three months); Koppa and Sringeri of Chikmagalur district of Karnataka (once in a year); and Peechi, Trichur district of Kerala (once in a year). Based on the intensity of disease, three types of samples were collected from the disease affected gardens viz., apparently healthy, early stage and advanced stages of the disease (four palms in each type). The

healthy samples were collected from Vittal (Dakshina Kannada district) and Thirthahalli (Shimoga district) of Karnataka state for comparison.

Temporary mounts of longitudinal slice (1×0.5 cm) of roots were examined under microscope for streaming of bacterial ooze (Rangaswamy and Rajagopal, 1973; Srivastava et al., 1970). The bacterial ooze was observed using the cut roots placed in a beaker containing sterile water.

The root and leaf pieces of 0.5-1 cm length were surface-sterilized in 0.1% $HgCl_2$, and were transferred to petri dishes containing nutrient medium. Several media were tried for the isolation of bacteria (Table I). The two methods followed for the isolation of bacteria were (i) plating the root pieces as such on the nutrient media after surface sterilization, and (ii) macerating the root pieces in sterile water and culturing by dilution plate method. The petridishes were incubated under laboratory conditions and plates were observed daily for the bacterial growth. The bacterial colonies were subjected to Gram's staining.

The results of the present experiment revealed that there was no bacterial

Table I. Isolation of phytopathogenic bacteria in the yellow leaf disease of areca using different media

Culture media*	Samples from YLD infected palms		Samples from healthy palms	
	Bacterial growth	Per cent	Bacterial growth	Per cent
Nutrient Agar (NA)	+	20-100	+	20-100
NA + leaf extract (10%)	+	10-20	+	20-50
NA + root extract (10%)	+	25-50	+	20-60
Leaf extract agar (50%)	+	10-20	—	—
Root extract agar (50%)	+	10-20	—	—
Kelman's (<i>Pseudomonas</i>)	+	0-10	—	—
Drigloski (<i>Pseudomonas</i>)	+	0-10	+	20-60
<i>Xanthomonas</i>	+	0-20	+	0-25
<i>Corynebacterium</i>	—	—	—	—
<i>Agrobacterium</i>	—	—	—	—
Yeast extract glucose agar	—	20-100	+	20-100

* Observation is for the two methods used in the isolation

streaming in the roots of YLD affected palms (Table II). This observation is not in agreement with the earlier reports (Srivastava et al., 1970; Anonymous, 1975). However in the present study about 10 per cent of the root samples both from healthy and affected palms showed bacterial cloudiness. The cloudiness was generally observed in the degenerating roots and if the roots are stored for a longer period. This could be attributed to the presence of saprophytic bacteria during the degeneration of roots. Further, the cut roots placed in sterile distilled water also did not reveal the presence of bacterial ooze.

Attempts to isolate bacteria using different media have failed to implicate the presence of phytopathogenic bacteria (Table I). The samples from both infected and healthy palms showed the presence of *Bacillus* sp. and *Pseudomonas* sp. Earlier workers reported the presence

of *Bacillus* sp., *Pseudomonas* sp., *Serratia* sp. and *Xanthomonas* sp, from the disease affected areca leaves and roots. The pathogenicity trial conducted did not produce the disease symptoms on areca-nut seedlings (Anonymous, 1964; 1975). The occurrence of *Bacillus* sp. and *Pseudomonas* sp. is possible in the areca-nut roots during the process of root degeneration, as these saprophytes invade the roots.

Since *Bacillus* sp. and *Pseudomonas* sp. were recorded both from the YLD affected and healthy palms, the pathogenicity test was not conducted. Further the bacterial streaming test did not indicate any bacterial ooze in the roots of YLD infected palms. Hence the present investigation indicates that phytopathogenic bacteria do not seem to be associated in the yellow leaf disease of areca palm.

Table II. *Bacterial streaming in the roots of yellow leaf disease infected and healthy arecanut palms*

Place of sampling	Number of root samples			
	Total	Without streaming	With cloudiness	
Aranthodu	a	384	369	15
	b	384	367	17
	c	384	362	22
Koppa and Sringeri	a	96	91	5
	b	96	91	5
	c	96	89	7
Peechi	a	96	88	8
	b	96	86	10
	c	96	86	10
Vittal*		96	92	4
Thirthahalli*		96	89	7

* Healthy area b = initial stage of yellow leaf disease
a = apparently healthy c = advanced stage of yellow leaf disease

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