

COCONUT LEAF ROT INTENSITY AND FUNGAL INCIDENCE

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The coconut palm (*Cocos nucifera* Linn.) is attacked by different diseases in various parts of India. Among them the leaf rot is one of the important diseases and occur in association with root (wilt) in Kerala State bringing about sharp deterioration in conditions of the affected palms (Radha *et al* 1961; Srinivasan, 1991). The early symptoms of leaf rot generally appear in spindle leaves (Figs. 1-4) and the disease has been attributed to fungal etiology (Mc Rae, 1916; Sundararaman, 1925; Menon and Nair, 1951; Lily, 1981;

Srinivasan and Gunasekaran, 1992). Recent investigations have thrown light on the associated fungi and elucidated their composition (Srinivasan and Gunasekaran, 1993). Since leaf rot occurs in spindles in different intensities and a number of fungi are associated, it was felt cognisant to comprehend the incidence of various fungi in relation to intensity of the disease, and especially prior to advance rotting in spindles.

Coconut palms affected with leaf rot were selected and spindles excised. The spindles showing

symptoms of the disease were categorized under 3 grades viz., 1 to 5 per cent (I), 2.1 to 5 per cent (II) and 5.1 to 10 per cent (III) of spindle leaflets area infected.

The leaflet tissue portions showing symptoms of lesions/spots were cut into small pieces of approximately 0.5 cm size and sampled 50 leaf pieces per grade from 5 palms (pooled) at the rate of 10 pieces per palm. The isolation of fungi was done as described earlier (Srinivasan and Gunasekaran, 1993). The pattern of fungal incidence under differ-

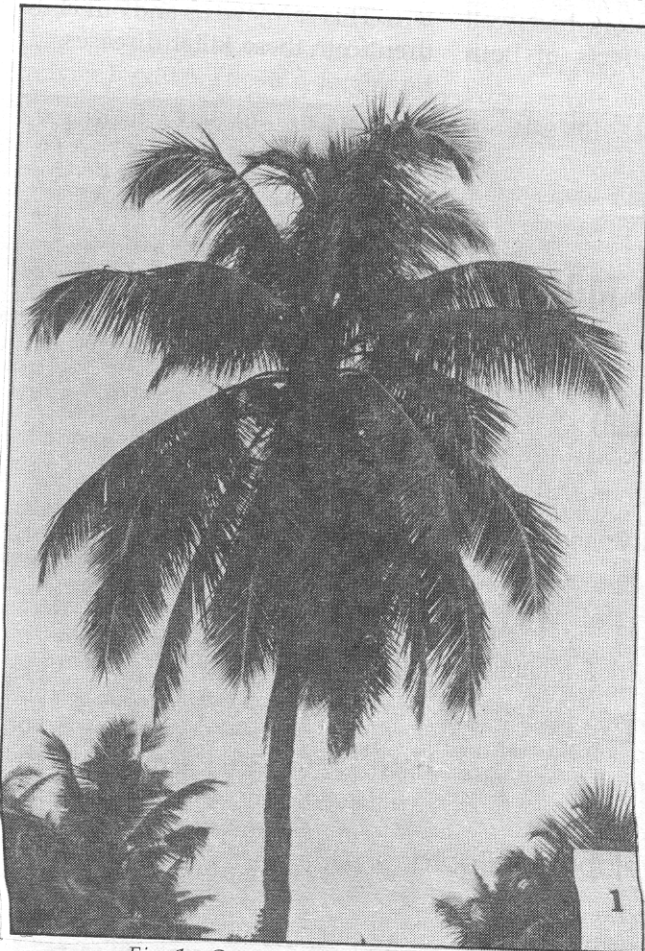


Fig. 1. Coconut palms - Healthy



Fig. 2. Leaf rot affected

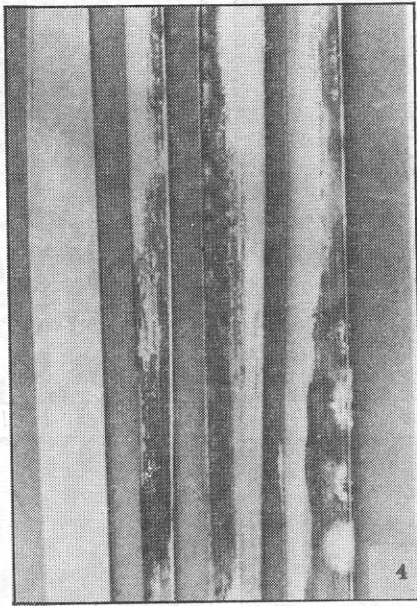
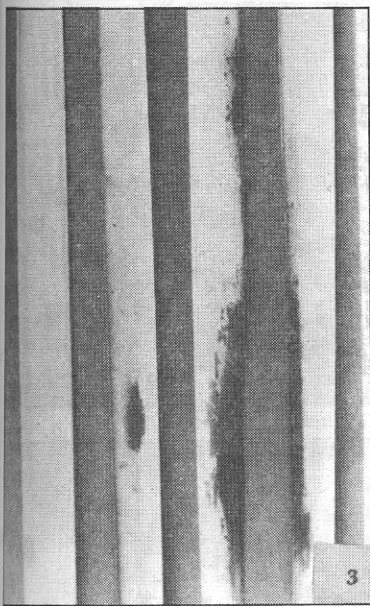


Fig. 3,4. Affected leaflets as compared to healthy

ent grades of leaf rot was studied twice (August and December).

The frequency of fungi isolated from leaf pieces under different grades is presented in Table 1. The percentage of fungal recovery from

leaf pieces was in the range of 42-50 in August and 66-70 in December, among different grades of spindle infection. The fungi viz. *Colletotrichum gloeosporioides* (Penzig) Penzig & Sacc.,

Exserohilum rostratum (Drechsler) Leonard & Suggs, *Fusarium* spp. (*F. solani* Martins (Sacc.) and *F. moniliforme* Sheldon var. *intermedium* Neish & Leggett and *Gliocladium vermoeseni* (Biourge) Thom. were consistently cultured from leaf rot affected tissues, irrespective of the grades / intensity of infection. Among the various fungi isolated from leaf rot *C. gloeosporioides* was more frequently observed *in vitro* in various grades, followed by the other forementioned fungi. Fungal development in combinations such as *C. gloeosporioides* and *E. rostratum*, *C. gloeosporioides* and *Fusarium* spp., and *E. rostratum* and *Fusarium* spp. were encountered in the present study. The other fungi isolated from leaf rot namely *Thielaviopsis paradoxa* (Dabe) C. Moreau, *Mortierella elongata* Linnem., *Rhizoctonia solani* Kuhn, *Cylindrocladium scoparium* Morgan and *Acremonium* sp. were far less

Photomicrographs of different fungi:

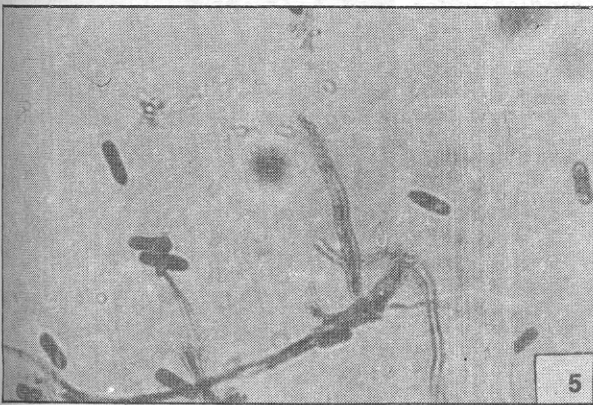


Fig.5. *Colletotrichum gloeosporioides*

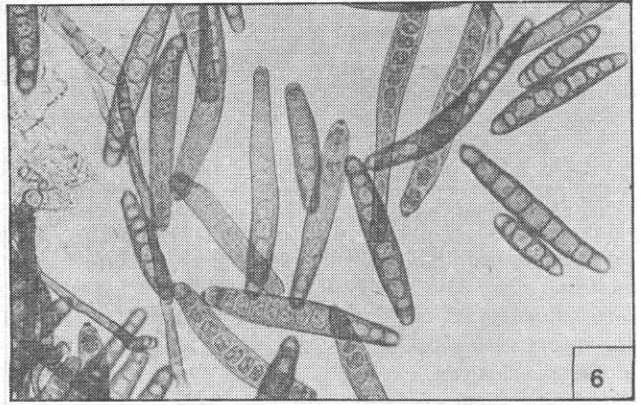


Fig.6. *Exserohilum rostratum*

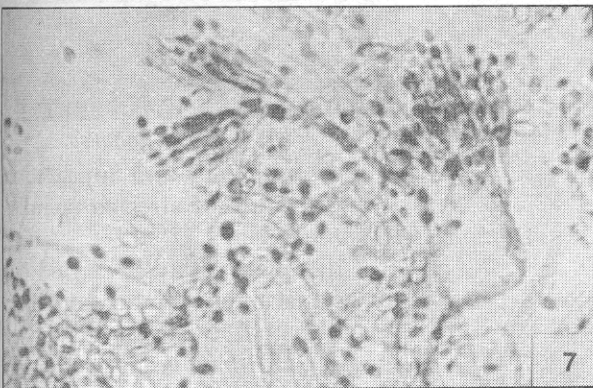


Fig.7 *Gliocladium vermoeseni*



Fig.8 *Fusarium solani*

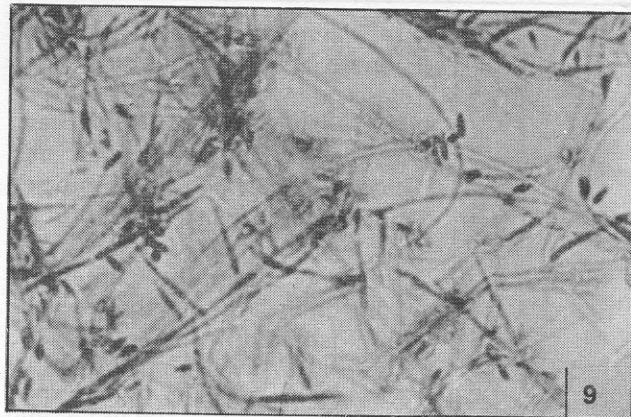


Fig.9. *Fusarium moniliforme*

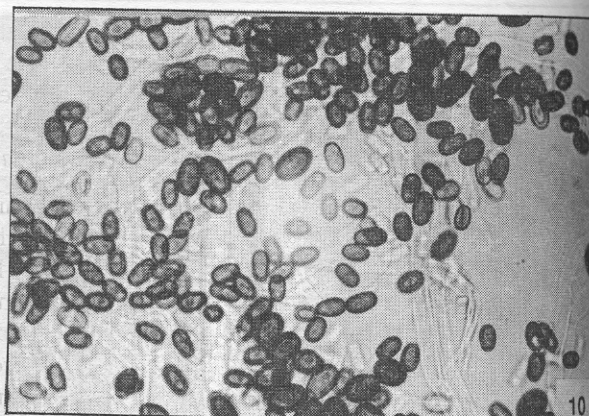


Fig.10. *Thielaviopsis paradoxa*

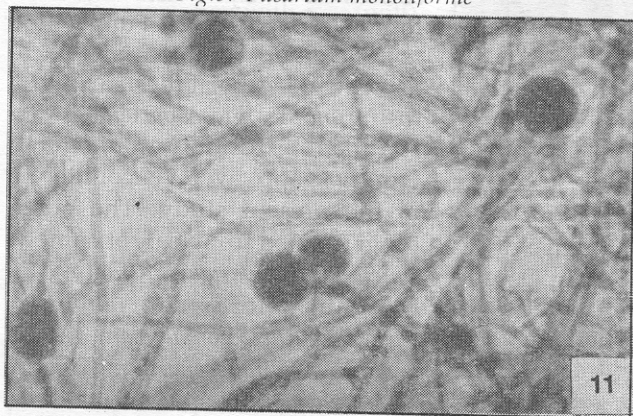


Fig.11. *Mortierella elongata*

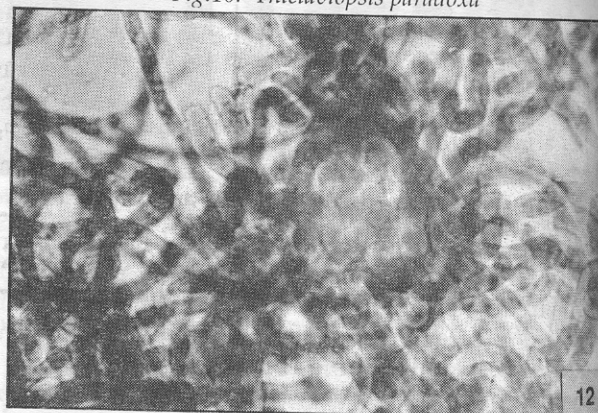


Fig.12. *Rhizoctonia solani*

Table 1. Fungi isolated from leaf rot affected coconut spindles under different grades of disease symptom.

Fungi isolated (independently or in combination)	No. of leaflet pieces developed fungal growth (out of 50 pieces per grade)*					
	August			December		
	I	II	III	I	II	III
<i>Colletotrichum gloeosporioides</i>	9(16)	10(14)	7(13)	12(20)	10(17)	7(15)
<i>Exserohilum rostratum</i>	4(9)	2(4)	2(6)	6(9)	4(9)	3(6)
<i>Fusarium</i> spp.	3(5)	3(5)	2(4)	5(12)	8(14)	8(13)
<i>Gliocladium vermoseni</i>	2(2)	3(3)	1(1)	3(3)	4(4)	2(2)
<i>Thielaviopsis paradoxa</i>	-	2	1	-	-	2
<i>Mortierella elongata</i>	-	-	1	-	-	-
<i>Rhizoctonia solani</i>	-	-	-	-	1	2
<i>Acremonium</i> sp.	-	-	1	-	-	-
<i>Cylindrocladium scoparium</i>	-	-	-	-	-	1
<i>C. gloeosporioides</i> + <i>E. rostratum</i>	5	2	4	2	3	3
<i>C. gloeosporioides</i> + <i>Fusarium</i> spp.	2	2	2	6	4	5
<i>E. Rostratum</i> + <i>Fusarium</i> spp.	-	-	-	1	2	-
Total No. of leaflet pieces developed fungal growth	25	24	21	35	36	33
Percentage of fungal recovery	50	48	42	70	72	66
Chi-square value	2.23 (Not significant)		1.29 (Not significant)			

* Figures within the parentheses are pooled No. of leaflet pieces for concerned predominant fungi subjected for chi-square analysis.



Fig.13. *Cylindrocladium scoparium*



Fig.14. *Acremonium* sp.

in their frequency and appeared in II or III grade of affected spindles (Figs. 5-14).

Chi-square analysis carried out for August and December samplings revealed that the four genera of fungi occur in a similar proportion irrespective of the disease grades.

Isolation of different fungi from leaf rot in phases of its development confirms our earlier observation of the association of more than one fungus with the disease (Srinivasan and Gunasekaran, 1993). The results of the present study corroborate the predominantly associative fungi irrespective of degree of symptom and further points to the complex nature of disease.

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