

Mycoflora of leaf rot affected coconut palms*

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The coconut palm (*Cocos nucifera* L.) is prone to different diseases in India. Leaf rot disease commonly occurs superimposed on root (wilt) disease affected palms in Kerala State (2, 4). The disease usually appears in the emerging spindle leaves as tiny water soaked lesions, which later coalesce developing into rotting of tender tissues (5). The disease has been attributed to fungal etiology (1, 3, 6). In leaf rot diseased palms, profuse fungal mycelial growth and spore masses are commonly visible over the lesions/necrotic tissues of the leaflet surface and specially between the infected leaflets of unopened spindles. No study has been made earlier on the leaf surface mycoflora of leaf rot disease. An attempt, therefore, has been made to record the prevalence of different mycoflora on leaflets of diseased spindles and leaves.

During June atleast 3 leaflets each with typical leaf rot symptoms from 100 spindles were selected at random and a segment of approximately 7.0 cm length was cut from each leaflet. The leaflet pieces were individually placed in small sterilized polyethylene bags containing moist cotton; incubated at room temperature (approx. 30°C)

for 2-3 days in laboratory for its fungal growth. The fungal masses were removed and kept on microslides, stained with lactophenol-cotton blue and examined under a light microscope. Five replicates were kept for each leaflet. Similar studies were carried out during August using the leaflets of inner, middle and outer whorls of the crown, showing symptoms of leaf rot from 20 palms. The fungi observed in leaf scrapings were identified and their relative frequency recorded.

Isolation of fungi associated with leaf rot was also simultaneously carried out from 120 palms. From each palm atleast 25 leaflet pieces (approx. 0.5 cm) were cut and used for isolation on potato-dextrose agar medium by conventional isolation technique. The fungi isolated from spindle and other older leaves were identified and their relative occurrence tabulated.

The fungal masses were seen in different shades of colour combinations as white, off-white, brown, dark brown, grey, black, pink etc. on the surfaces of leaflets in different portions. In certain spindles, where the symptoms appeared in basal leaflets, extensive fungal growth was observed.

The fungi observed in leaf scrapings/isolated from spindles and other parts of the leaves were identified upto species level (Table 1). Among the fungi recorded from scrapings of spindle leaves,

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Table 1 : Fungi observed in scrapings and isolated from spindles and other leaves of coconut affected by leaf rot

Sl. No.	Fungi (IMI Nos.)	No. of spindles yielding different fungi (out of 100 spindles)			No. of palms yielding different fungi from older leaves (out of 20 palms)		
		Independently	In combination	Total	Independently	In combination	Total
A. Observed from scrapings							
1.	<i>Colletotrichum gloeosporioides</i> (IMI 349539)	13	34	47	0	13	13
2.	<i>Exserohilum rostratum</i> (IMI 349538)	1	9	10	0	4	4
3.	<i>Gliocladium vermoeseni</i> (IMI 349540)	7	7	14	0	11	11
4.	<i>Fusarium solani</i> (IMI 349542)/ <i>Fusarium moniliforme</i> var. <i>intermedium</i> (IMI 350497 b)	18	47	65	0	18	18
5.	<i>Thielaviopsis paradoxa</i> (IMI 349541)	1	16	17	0	9	9
6.	<i>Rhizoctonia solani</i> (IMI 356503)	0	2	2	0	1	1
7.	<i>Cylindrocladium scoparium</i> (IMI 350499)	0	1	1	—	—	—
8.	<i>Mortierella elongata</i> (IMI 352402)	0	2	2	—	—	—
9.	<i>Pestalotiopsis palmarum</i>	—	—	—	0	3	3
B. Isolated in medium							
1.	<i>Colletotrichum gloeosporioides</i>	24	63	87	0	20	20
2.	<i>Exserohilum rostratum</i>	0	37	37	0	17	17
3.	<i>Gliocladium vermoeseni</i>	1	25	26	0	12	12
4.	<i>Fusarium solani</i> / <i>Fusarium moniliforme</i> var. <i>intermedium</i>	0	32	32	0	14	14
5.	<i>Thielaviopsis paradoxa</i>	3	12	15	0	1	1
6.	<i>Rhizoctonia solani</i>	0	8	8	0	3	3
7.	<i>Cylindrocladium scoparium</i>	—	—	—	0	1	1
8.	<i>Mortierella elongata</i>	0	4	4	—	—	—
9.	<i>Pestalotiopsis palmarum</i>	—	—	0	—	2	2

Fusarium solani/*Fusarium moniliforme* var. *intermedium* was observed in 65 spindles, followed by *Colletotrichum gloeosporioides* (47), *Thielaviopsis paradoxa* (17), *Gliocladium vermoeseni* (14) and *Exserohilum rostratum* (10). These fungi were observed either independently or in combinations in different proportions. Fungi other than the aforesaid species whatsoever were encountered in very low frequency.

Among the fungi observed in scrapings from leaves other than spindles, *C. gloeosporioides*, *E. rostratum*, *G. vermoeseni*, *Fusarium* spp., *T. paradoxa* and *Rhizoctonia solani* were the same as that observed in spindle leaflets. None of these fungi occurred independently in the developed leaves. *Fusarium* was observed in the scrapings from 18 palms, followed by *C. gloeosporioides* (13), *G. vermoeseni* (11), *T. paradoxa* (9) and

E. rostratum (4). *R. solani* and *Pestalotiopsis palmarum* were encountered in 1-3 palms only. The epiphytic mycoflora of leaf rot affected leaves (other than spindle) tend to indicate an equilibrium as the symptoms advanced in developed leaves and exposed to environment over a period of time. The fungal pathogens implicated in the disease are likely to interact among themselves and with other epiphytic mycoflora in the course of competitive ability.

In addition to these fungi, *Mortierella elongata* was isolated from spindles while *Cylindrocladium scoparium* and *P. palmarum* from older leaves. *C. gloeosporioides*, *G. vermoeseni* and *T. paradoxa* were isolated from the spindles either independently or in combination and rest of the fungi appeared in combinations. All the fungi isolated from older leaves occurred only in combinations. *C. gloeosporioides*, *E. rostratum*, *G. vermoeseni* and *Fusarium* spp. were isolated comparatively in higher frequency both from spindle and older leaves of leaf rot affected palms. Srinivasan and Gunasekaran (6) reported species composition of leaf rot fungi. In the present study, the epiphytic mycoflora prevailing on the surface of diseased tissues has also been brought out. The leaf rot is construed as a disease of fungal complex.

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