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ETIOLOGY - FUNGI

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Investigations on the association of fungi with the root (wilt) disease of coconut were started by Butler (1908) who observed the common occurrence of *Botryodiplodia theobromae* Pat. in the roots of diseased palms. He suggested that the root rotting due to this fungus could be the cause of the disease. Subsequent investigations (Menon and Nair, 1949) showed the constant association of *Rhizoctonia solani* Lutu and *R. bataticola* (Taub.) Butl. in the roots of diseased palms besides *B. theobromae*. Comparative studies on the occurrence of these two fungi in healthy and diseased areas indicated that *R. solani* being confined to the roots of disease affected palms (Radha and Menon, 1954) was more specific than *R. bataticola*. Other fungi recorded by Radha and Menon (1954) were *Neocosmospora vasinfecta* Smith, *Gloeosporium* sp., *Gliocladium* sp., *Pestalotia* sp., *Curvularia* sp., *Chaetomium* sp. and *Trichoderma* sp.

The occurrence of *Cylindrocarpon effusum* Bugn. and *Fusarium equiseti* (Corda) Sacc. in roots showing vascular discolouration was reported to be 12 to 20 per cent (Anon., 1976). Decayed roots from diseased palms had fungal hyphae in metaxylem (Govindankutty and Vellaichamy, 1983). Joseph (1978) reported occurrence of *C. effusum*, *F. equiseti*, *Monacrosporium bembicodes* (Drechsler) Subram., *Penicillium javanicum* var *Beyma*, *P. spiculiosporum* Lehman and *Graphium* sp. in diseased palms. *Cylindrocarpon* spp. were

also isolated from burrowing nematode lesions on roots from low lying and irrigated plots (Anon., 1979).

Inoculation experiments with *R. solani* and *R. bataticola* in the field as well as in large size cement tubs brought about rotting of roots, but failed to produce the foliar symptoms characteristic of root (wilt) disease (Menon and Nair, 1951). Infectivity of these organisms was aggravated by waterlogging (Menon *et al.* 1952).

Radha and Menon (1957) reported differential behaviour of *R. solani* and *R. bataticola* with regard to their moisture requirement. While *R. solani* preferred soil moisture above 20 per cent for mycelial growth, *R. bataticola* was found to tolerate a wider range of soil moisture. Observations of Lily and Jayasankar (1974) that *R. solani* elaborated pectin methyl esterase, polygalacturonase and pectin transeliminase in culture filtrates further support the role of *R. solani* in causing the rotting of roots.

Apparently healthy roots from disease affected palms harboured *F. equiseti* and *C. effusum*. On inoculations, these fungi established infection in roots of potted seedlings maintained in sterile soil. As the infection progressed, roots of the coconut seedlings exhibited black necrotic patches on the mature parts mainly at the region of formation of breathing pores, branching of rootlet etc. There was a reduction in the

number of surface feeder roots and a majority of them were rotten. Observations on the complete root system of the inoculated seedlings indicated 20 per cent root rot in *F. equiseti* - inoculated seedlings as against 13.5 per cent in seedlings inoculated with *C. effusum*, while there was 5 per cent rotting in the uninoculated check plants (Lily, 1979; 1981 a). The percentage of rotting increased as the infection period prolonged (Lily, 1982). Lily (1983) observed the presence of toxin in culture filtrate of *F. equiseti*. Trials with *C. lucidum* also showed rotting of the root system. Extensive rotting of the tips of main roots and lateral roots was recorded in the inoculated seedlings. On an average 50 per cent of the roots were decayed in inoculated

seedlings as against 5 per cent in the control seedling. The inoculated seedlings showed retarded growth and increased rotting of roots (Lily, 1981 b).

Pathogenicity trials conducted on coconut seedlings in microplots of size 1.8m x 1.8m x 1.2m using the fungi *F. equiseti* and *C. effusum* failed to reproduce the symptoms of root (wilt) disease, when inoculated singly and in combination with the burrowing nematode, *Radopholus similis* and the bacterium, *Enterobacter cloacae* (Anon., 1985).

The investigation carried out so far have not indicated any role of the fungi in inciting the disease.

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