

**FUNGAL DISEASES ASSOCIATED WITH  
COMMONLY GROWN ORNAMENTAL FOLIAGE PLANTS  
IN SRI LANKA AND THEIR MANAGEMENT**

**By**

**W.W.Y. WIMALASENA**

**(FGS/01/02/01/2008/02)**

ප්‍රවේශ අංකය:	1226
වසර අංකය:	

**Dissertation submitted to the Faculty of Graduate Studies,**

**University of Kelaniya, Kelaniya, Sri Lanka for the**

**degree of Master of Philosophy in Botany**

**March 2015**

## ABSTRACT

Ornamental foliage plant industry in Sri Lanka is a major foreign exchange generating enterprise and supplies cut flowers, cut leaves, live plants, propagating material, dried floricultural material and floriculture arrangements to the local and export markets. Although fungal diseases prevalent in commercial foliage plant nurseries reduce the quality of plant material and cause substantial losses to nursery owners, comprehensive records of such diseases in Sri Lanka are not available. Therefore, this study was carried out to identify the more common and economically important fungal diseases prevalent in selected foliage plant nurseries in Sri Lanka with a view to identify the causative agents and to investigate the most suited management practices for such diseases.

Foliar diseases prevalent in seven of the biggest export oriented nurseries in Central, Western and North-Western provinces of Sri Lanka were studied. Varieties of *Aglaonema*, *Calathea*, *Codiaeum*, *Dracaena*, *Dieffenbachia*, *Livistona*, *Schefflera*, *Chrysalidocarpus*, *Cordyline*, *Polyscias*, *Pothos*, *Miscanthus*, *Anthurium*, *Spathiphyllum* are the commonly grown foliage plants in these nurseries and the most prevalent symptoms observed in all nurseries was leaf spots and lesions. *Fusarium*, *Cylindrocarpon*, *Acremonium*, *Nectria*, *Curvularia*, *Cylindrocladium* and *Penicillium* were the most frequently isolated fungal pathogens from these diseased plants.

In addition to confirming the pathogenicity of the most commonly isolated fungal pathogens i.e. *Fusarium* sp, *Cylindrocarpon* sp., *Nectria* sp., *Curvularia* sp., and *Cylindrocladium* sp using intact healthy plants, a bio assay using detached leaves inoculated with spore suspensions of the test fungi was developed and the results

were compared with their effect on whole plants. The symptom production in detached leaves and whole plants was similar as well as being similar to previous symptoms observed in samples used for pathogen isolations indicating that the bioassay using detached leaves can be used as a quick and easy method for testing the pathogenicity of fungal pathogens on foliage plant varieties.

Four fungicides with active ingredients hexaconazole, carbendazim, mancozeb and propineb were screened at different concentrations using the Poisoned Food Technique (PFT) and Conidial Germination Inhibition Test (CGIT) to evaluate their efficacy on the control of mycelial growth and spore germination of *Fusarium* sp, *Cylindrocarpon* sp., *Nectria* sp., *Curvularia* sp., and *Cylindrocladium* sp. The four fungicides tested controlled the mycelial growth of all test fungi at varying concentrations whilst carbendazim was the most effective achieving 100% control at the lowest concentration (10 mg/l) tested. Conidial germination of all fungi was inhibited (100%) at 0.5 mg/l by all four fungicides tested. A bio assay developed using detached foliage plant leaves to assess the efficacy of hexaconazole, carbendazim and propineb on controlling symptom development showed that the three fungicides were effective on controlling symptom development by *Fusarium* sp, *Cylindrocarpon* sp and *Nectria* sp on the leaves of *Dracaena sanderana*, *Calathea insignis* and *Chrysalidocarpus* respectively and inhibited symptom development at a low concentration of 10 mg/l. Their efficacy of control was also tested on whole plants of *Dracaena sanderana* varieties (*victory*), (*white*), (*gold*), (*purple compactum*) and *Calathea insignis* inoculated with the same fungal species under greenhouse conditions. A considerably higher concentration (500 mg/l) of all fungicides tested was required for symptom development inhibition *in planta*.

The effect of a locally isolated *Trichoderma* sp on growth inhibition of the test fungi was evaluated using dual culture assay. Mycelial growth of *Fusarium* sp, *Cylindrocarpon* sp., *Nectria* sp., *Curvularia* sp., and *Cylindrocladium* sp. was inhibited by the *Trichoderma* isolate and structural mechanisms of mycelial growth control were observed.

**Key words: ornamental foliage plants, fungal diseases, Poison Food Technique, spore inoculation, bio control**