

## **INSECT, MITE AND DISEASES INFESTATIONS IN EXPORT FOLIAGE NURSERIES IN SRI LANKA**

L.C. HEWAGE, H.M.R.K. EKANAYAKA, K.N.S. FERNANDO,  
N.P.H. NIMALANANDA, W.M.R. FERNANDO and R.U. WEERASINGHE  
*National Plant Quarantine Service, Canada Friendship Road, Katunayaka*

### **INTRODUCTION**

National Plant Quarantine Service (NPQS) is responsible for inspection, testing and issuing test reports for export consignments during phytosanitary certification. In this regard, pest surveillance, pest monitoring and inspection of export nurseries according to IPPC standards is important for market access (ISPM, No.4, 1999). Therefore, documentation and monitoring of pest status in export nurseries is an essential phytosanitary requirement to identify the pest free areas. Chase (1989); Chase and Brosch (1993); Moorman (1998) and Strider (1985) have recorded the pests of ornamental plants in the world. Kudagamage *et al.* (1998) and Kelaniyangoda *et al.* (2002) have recorded pests and diseases of some foliage plants in Sri Lanka. The objectives of this study were to collect information on insect pests, mites and diseases in export foliage nurseries which requested additional declarations from the NPQS and to identify the host range.

### **MATERIALS AND METHODS**

A field survey was conducted during 2005-2006 in 18 foliage nurseries which requested additional declarations for phytosanitary certification from NPQS. A total of 17 nurseries were included in this study.

A team of entomologists and plant pathologist inspected the propagators and mother plant stocks in each nursery. Prevalence of insects, mites and diseases were recorded and infested sample were brought to the NPQS for identification and laboratory investigations.

Immature stages of insects and mites were incubated in humid chambers at room temperature ( $25 \pm 2^{\circ}\text{C}$ ), for 5-10 days until adult emergence.

Pathogenic fungi were identified visually by colony characteristics and identification confirmed by examining slide mounted preparations. Bacterial colonies were identified using physiological and biochemical tests as given by Schaad (1988).

## RESULTS AND DISCUSSION

485 plant varieties were inspected during the survey and 79 plant species were found infested with insects and mites while 16 species were infested with pathogens. Nutrient deficiencies were at negligible levels in few plant species.

Insects, mites and disease incidence in all nurseries were very low, due to regular pesticide application. Few specimens of plant hoppers, leaf miners, plant bugs and coleopterans were detected (Table 1).

Scale insects and mealybugs were widespread in export foliage plants, which causing a reduction in the export value. Root mealybugs were observed in roots of *Livistonia rotundifolia* in two nurseries.

Palm weevils were observed in mother plants of cane palms and queen palms in two nurseries. Mature palm trees had died due to damage to the base of the plant by larvae of palm weevil and also due to secondary infestations. However, this pest is under control due to baiting of adults and chemical control.

Damage caused by lepidopterous larvae, grasshoppers and coleopteran pests to leaves of plants led to increase direct rejections of cut leaves for export in most nurseries. *Bemisia tabasi* was identified in few *Codiaeum* spp. Damage by snails and slugs was observed in *Cordyline* spp. in upcountry nurseries.

*Fusarium* spp., *Alternaria* spp., *Colletotrichum* spp., *Curvularia* spp. and *Rhizoctonia* spp. were common fungal diseases in most foliage nurseries but disease severity was low. Severe bacterial infestations caused by *Erwinia* sp. was observed in *Aglaonema* spp., *Sansevieria* sp. and *Philodendron* sp., mainly due to use of unsterilized growing medium with high plant density (Table 2). All the diseases detected are cosmopolitan (Chase and Brosch, 1993).

PESTS AND DISEASES OF FOLIAGE PLANT 229


Table 1. Insect pests and mites detected in export foliage plants.

Plant family	Foliage plants	Aphids	Coleopterans	Grasshoppers	Lepidopterous pests	Leafminers	Mealybugs	Scale insects	Thrips	Whiteflies	Mites	
Araceae	<i>Dieffenbachia</i> spp (‘Camilla’, ‘Compacta’, ‘Tropic snow’)	+						+			+	
	<i>Aglaonema</i> spp (‘maria’, ‘Silver queen’)	+					+		+			
	<i>Ag.</i> ‘Pseudo bracteatum’							+				
	<i>Philodendron</i> spp (‘scandans’, Lime)	+		+					+			
Acanthaceae	<i>Aphelandra squarrosa</i> (Zebra plant)	+							+			
	<i>Palmae</i>											
Palmae	<i>Areca lutescens</i> (Cane Palm)		+					+				
	<i>Areca lutescens</i>		+									
	<i>Livistonia rotundifolia</i>		+	+			+	+			+	
Rubiaceae	<i>Beaumontia grandiflora</i> (Gradenia)	+					+	+		+		
Marantaceae	<i>Calathea mosaika</i>			+								
	<i>Calathea</i> ‘Insignis’			+	+						+	
	<i>Calathea</i> ‘Ornata’			+	+						+	
Agavaceae	<i>Cordyline americana</i>										+	
	<i>Cor.</i> ‘Kiwi’			+				+	+		+	
	<i>Cor.</i> ‘Prince albert’			+				+	+		+	
	<i>Cor</i> ‘White edge’							+			+	
Agavaceae	<i>Dracaena marginata</i>							+				
	<i>Dr.</i> ‘Purple compacta’						+	+			+	
	<i>Dr. marginata</i> Spp (‘colerama’, ‘Green’, ‘godseffiana’, ‘Florida beauty’, ‘Gold’, ‘Victory’, ‘White’, ‘massangiana’, ‘Red edge’, ‘Tricolor’, ‘Green’, ‘colorama’, ‘Song of india’ ‘Song of jamaika’			+			+	+				
	<i>Echinodorus bleheria</i>				+							
	<i>Ech.</i> Green leporid				+							
	<i>Ech. arvijlorus</i>				+							
	<i>Ech.</i> Red leporid				+							
	Moraceae	<i>Ficus benjamina</i>								+		
		<i>Ficus</i> spp.				+		+				+
	Malvaceae	<i>Hibiscus</i> ‘Pink’	+			+		+			+	+
<i>Hibiscus</i> ‘Rose’		+			+		+			+	+	
<i>Hibiscus</i> ‘Red’		+			+		+			+	+	
Asclepiadaceae	<i>Hoya carnosa</i>	+					+	+		+		

Plant family	Foliage plants	Symptoms									
		Aphids	Coleopterans	Grasshoppers	Lepidopterous pests	Leafminers	Mealybugs	Scale insects	Thrips	Whiteflies	Mites
Rubiaceae	<i>Hydrocoty lencocephala</i>				+	+					
	<i>Ixora</i> 'Jungle flame'				+		+	+		+	
	Gauka				+					+	+
Poaceae	<i>Ophiopogon</i>				+		+				
	'Miscanthus white'				+		+				
	'Miscanthus green'				+		+				
Araliaceae	<i>Plumeria</i> 'White'	+					+	+	+	+	+
	<i>Plumeria</i> 'Pink'	+					+	+	+		+
	<i>Polyscias balfouriana</i>	+					+				
	'Butterfly'										
	<i>Pol. Balf.</i> 'guilfoylei'	+					+				
	<i>Pol. Balf.</i> 'filicifolia'	+					+				
	<i>Schefflera</i> 'gold capella'	+						+	+		+
	<i>Schefflera</i> 'Trinette'	+						+	+		+
<i>Schefflera</i> 'Green'	+						+	+		+	
<i>Scindapsus</i>							+	+			
'marble queen'							+	+			
<i>Scindapsus</i>							+	+			
'aureus'							+	+			

**Table 2. Microorganisms associated with various symptoms in export foliage plants.**

Hosts	Symptom observed	Microorganisms detected
<i>Polyscias</i> 'balfouriana'	Stem rot, root rot	<i>Fusarium pallidosorum</i>
<i>Polyscias</i> 'butterfly'		
<i>Polyscias</i> 'flicifolia'		
<i>Polyscias</i> 'crispum'		
<i>Polyscias</i> 'gulifolia'		
<i>Dr. sanderiana</i> 'Gold'	Brownish circular leaf spots and Leaf die back	<i>Alternaria tenuis.</i>
<i>Dr. sanderiana</i> 'Victory'	Irregular necrotic spots with whitish centre	<i>Fusarium</i> spp
<i>Dr. sanderiana</i> 'White'	Elliptical necrotic spots, front tip Necrosis, circular leaf spots	<i>Colletotrichum</i> sp.
<i>Livstonia chinensis</i>		<i>Pestalotia</i> sp
		<i>Alternaria</i> sp.
		<i>Curvularia</i> sp.
		<i>Drechslera rostrata</i>
<i>Polyscias</i> sp.	Collar rot under wet conditions, a fine webbing of fungal growth can be observed on the soil surface	<i>Pthium</i> sp
		<i>Rhizoctonia</i>

<i>Hosts</i>	<i>Symptom observed</i>	<i>Microorganisms detected</i>
<i>Aglaonema</i> 'silver queen' <i>Aglaonema</i> 'maria' <i>Ag.</i> 'psudo bacteatum' <i>Philodendron</i> sp. <i>Sansevieria</i> sp.	Anthracnose leaf spots and Soft rot	<i>Erwinia</i> sp
<i>Pothus aurius.</i> <i>Dracena</i> sp. <i>Godssafiana</i> sp. <i>Chlorophytum</i> sp.	 Water- soaked spots with yellow holes. Center of the spots fall out under wet condition. Cuttings have poor root system and yellow leaves. Leaves of established plants become yellow and die.	<i>Pseudomonas</i> sp.
<i>Schefflera</i> sp. <i>Syngonium</i> sp.	Large dark brown spots on leaves Very dark green spots engulf the leaf in a soft rot that smells foul. When stems are infected lower leaves wilt and die. Translucent spots on leaf, margins become dull green with a bright yellow hole	<i>Alternaria</i> sp <i>Erwinia</i> sp <i>Pseudomonas</i> <i>Xanthomonas</i>

### CONCLUSIONS

Mild contamination of pest populations could be controlled by regular inspection of host plants. Therefore, introduction of a regular pest monitoring system and training nurserymen on record keeping is recommended. Common diseases could be controlled by chemical and/or physical sterilization of the medium together with the adoption of proper cultural practices in nurseries. Selection of healthy planting materials is very important to prevent the spread of insect pests, mites and diseases within nurseries. Therefore, by implementing intergraded pest management system, the export foliage nurseries can enhance the production of pest free quality export products and minimize the export rejection at nursery level, the country's foreign exchange earnings through foliage exportation can be enhanced.

### ACKNOWLEDGEMENTS

Grateful acknowledgements are made to Sri Lanka Council of Agriculture Research Policy for financial assistance and to all managers of the export foliage nurseries for their kind cooperation.

### REFERENCE

Chase, A.R. 1989. Compendium of foliage plant Diseases. APS Press. USA, 89 p.

- Chase, A.R. and L.R. Brosch. 1993. Diseases of ornamental plants. The American Phytopathological Society, St Paul, Minnesota. USA. 92 p.
- Kudagama, C., I.J.De Zoysa and H.M.R.K. Ekanayake. 1998. Pest and diseases of ornamental plants. Horticultural Crop Research and Development Institute, Department of Agriculture, Peradeniya.
- ISPM. Requirements for the establishment of pest free areas, 1996. Pub. 4, FAO, Rome.
- Kalaniyangoda, D.B, N.P.H. Nimalananda, A.C.U. Senarathne and R.S.Y.De Silva. 2002. Identification of plant pathogens associated with foliage plants. ASDA 4;281-289.
- Moorman, G.W. 1998. Plant disease facts, cooperative extension service. The Pennsylvania State University, 34p.
- Schaad, N.W. 1988. Laboratory guide for identification of plant pathogenic bacteria. ASP Press. St. Paul; Minnesota. 164 p.
- Strider, D.L. 1985. Disease of Foliage. Vol. 2 Para Scientific. New York. 638p.