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INVASION OF *PARATACHARDINA LOBATA LOBATA* (HEMIPTERA: KERRIIDAE) IN SOUTH FLORIDA: A SNAPSHOT SAMPLE OF AN INFESTATION IN A RESIDENTAL YARD

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The lobate lac scale, native to Sri Lanka and India (Varshney 1976), was first detected in Davie, Broward County Florida in August 1999 and then in Miami Dade during March 2000 (Hamon 2001). By the spring of 2002, the insect began to appear in alarming densities on many different host plants in Broward County. To obtain an idea of the current and potential infestation of this scale on plants in South Florida, a "snap-shot" sample was made in a single Ft. Lauderdale residential yard known to be infested with the scale during July, 2002. Although modest in terms of area examined and duration of study, this sample offers a compelling picture of the scale's extreme polyphagy and may provide indications of relative susceptibility of different plants and plant groups.

The 1/3 acre yard examined was selected because of its diverse plantings of tropical fruit, native plants, and horticultural plants including important landscape trees and shrubs. It was also chosen because of the absence of pesticide use which might influence infestation, although county mosquito control fogging trucks operate periodically within 30 meters of the property, particularly during the summer. A total of 67 woody plant species in 30 plant families were examined for presence of the scale. A total of 83 individual plants were examined and seven species were sampled more than once. Plants sampled were at least one meter tall and present in the yard for at least one year. Each plant was scanned for about 30 seconds, except for orange and tangelo, which were examined for about five minutes because of their economic importance. If the scale was found, estimates of infestation were made by judging the number of morphologically distinct mature females in 30 cm length of branch as follows. Heavy infestations had more than 100 scales per 30 cm, moderate infestations had between 10 and 100, and light infestations had fewer than 10.

The scale was found in 37/67 (55%) of the plant species in 19/30 (63.3%) of the plant families (Table 1). Of the attacked species, 16% (6/37) had plants rated as heavily infested, 40% (15/37) had moderately infested plants, and 62% (23/37) had lightly infested plants. Of the 83 individual plants examined, 46 or 55% were infested. The most severely impacted plant was the native wax myrtle (*Myrica cerifera* L.); three of the five plants examined had been killed and the other two were dying. The scale completely covered branches of these plants. Other heavily infested species included native wild coffee (*Psychotria nervosa* Sw.), ornamental *Michelia* sp. and common hibiscus, and the fruit tree carambola (*Averrhoa carambola* L.). All of these exhibited branch dieback. Large landscape trees, such as native laurel oak and exotic black olive, bore moderate infestations. All four mango varieties (Carrie, Jakarta, Dot and Valencia Pride) were infested and three had moderate infestations. Grapefruit and kumquat had light levels of the scale, while sweet orange and tangelo were free of the insect. Emperor lychee was attacked but Brewster lychee was not. The three annonacious fruits, sugar apple, sour sop and atemoya were all attacked. One species, wild coffee, experienced the full range of infestation levels from absence to heavy. Attacked species belong to a diverse spectrum of unrelated families from the primitive Magnoliaceae and Lauraceae to the advanced Rubiaceae. Of the 17 families with more than one species in the sample, four had all species attacked, four had none attacked, and nine had both attacked and unattacked species. Seven of eight Myrtaceae and three of four Rubiaceae were infested by the scale. Three of the seven Rutaceae present were infested. Three of seven genera with multiple species had both attacked and unattacked species, while plants in the other four genera were either all attacked or unattacked.

Because it is unknown how long the scale has been at this site, infestation and level of infestation on particular plant species may reflect the state of invasion and degree of population growth. Uninfested and lightly infested plants may reflect preference of the scale for other plants, rather than absence of susceptibility. For this reason, presence of the scale in the sample is more important than its absence. What is clear is that the scale attacked the majority of species and families represented in the yard as well as the majority of individual plants examined. It also used a wide variety of plant types including native species, commercial fruit, and important landscape trees and shrubs. *Paratacharina lobata lobata* is becoming a serious pest, due to rapid rate of spread, wide host range, and severe impacts to plants such as branch dieback and death of some hosts.

Research is urgently needed to determine how to control the lobate lac scale and how, if possible, to limit its spread. Control research should include both chemical and biological control. Infestation of native plants indicates the scale's ability to invade natural areas where chemical control

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TABLE 1. PLANTS EXAMINED FOR LOBATE LAC SCALE INFESTATION IN A FT. LAUDERDALE RESIDENTIAL YARD DURING JULY 2002.

Family Species	Common name	Type of plant	Infested	Number infested			
				High	Medium	Light	None
Aceraceae							
Acer rubrum L.	Red maple	Native-ornamental tree	No				1
Apocynaceae							
Trachelopermum jasminoides (Lindl) Lem.	Confederate jasmine	Ornamental vine	No				1
Anacardiaceae							
Mangifera indica L.	Mango	Fruit tree	Yes		3	1	
Schinus terebinthifolius Raddi	Brazilian pepper	Ornamental tree	Yes			1	
Toxicodendron radicans (L.) Kuntze	Poison ivy	Native vine and weed	No				1
Annonaceae							
Annona squamosa L.	Sugar apple	Fruit tree	Yes		1		
Annona muricata L.	Soursop	Fruit tree	Yes		1		
Annona ×*Atemoya*	Atemoya	Fruit tree	Yes			1	
Clusiceae							
Rheedia aristata Griseb.	Rheedia	Fruit tree	Yes			1	
Rheedia sp.	Rheedia	Fruit shrub	Yes		1	2	
Combretaceae							
Bucida buceras L.	Black olive	Landscape tree	Yes		1		
Terminalia catappa L.	Tropical almond	Ornamental tree	Yes			2	
Euphorbiaceae							
Bischofia javanica Blume	Bischofia	Landscape tree	No				2
Codiaeum variegatum (L.) Blume	Croton	Ornamental shrub	No				3
Sauropus androgynus (L.) Merr.	Sauropus	Edible leaved shrub	No				1
Fabaceae							
Acacia farnesiana (L.) Willd.	Sweet acacia	Native-ornamental shrub	No				1
Cassia pendula Willd.	Christmas senna	Ornamental shrub	No				1
Fagaceae							
Quercus laurifolia Michx.	Laurel oak	Native-landscape tree	Yes		2	1	
Lamiaceae							
Ocimum sp.	Thai basil	Spice shrub	Yes			1	
Rosmarinus officinalis L.	Rosemary	Spice shrub	No				2
Lauraceae							
Cinnamomum zeylanicum Blume	Cinnamon	Ornamental shrub	Yes			1	
Laurus nobilis L.	Bay leaf	Spice shrub	Yes			1	
Magnoliaceae							
Michelia sp.	Michelia	Ornamental shrub	Yes	1			

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TABLE 1. (CONTINUED) PLANTS EXAMINED FOR LOBATE LAC SCALE INFESTATION IN A FT. LAUDERDALE RESIDENTIAL YARD DURING JULY 2002.

Family Species	Common name	Type of plant	Infested	Number infested			
				High	Medium	Light	None
Malvaceae							
Hibiscus rosa-sinensis L.	Hibiscus	Ornamental shrub	Yes	1			
Meliaceae							
Agalia odorata Lour.	Mi lan	Ornamental shrub	No				1
Moraceae							
Artocarpus heterophyllus Lam.	Jakfruit	Fruit tree	No				
Ficus benjamina L.	Benjamin fig	Landscape fig	Yes			1	
Morus X.	Mulberry	Fruit tree	No				2
Myricaeae							
Myrica cerifera L.	Wax myrtle	Native-ornamental shrub	Yes	1			
Myrtaceae							
Calyptranthes pallens Griseb.	Spicewood	Native-ornamental shrub	Yes		1		
Eugenia brasiliensis Lam.	Grumichama	Fruit tree	Yes		1		
Eugenia uniflora L.	Surinam cherry	Landscape hedge plant	Yes			2	
Eugenia aggregata (Vell.) Kiaersk.	Cherry-Rio Grande	Fruit shrub	No				1
Myrciaria cauliflora (C. Martius)	Jaboticaba	Fruit tree	Yes			1	
Myrciaria sp.	Yellow jaboticaba	Fruit shrub	Yes			1	
Pimenta dioica (L.) Merr.	All spice	Spice shrub	Yes			1	
Pimenta racemosa (Miller) J. Moore	Bay rum	Spice shrub	Yes			1	
Nyctaginaceae							
Bougainvilea X.	Bougainvillea	Ornamental vine	No				2
Oleaceae							
Jasminum gracillimum Hook. F.	Pinwheel jasmine	Ornamental shrub	No				1
Osmanthus fragans Lour.	Sweet olive	Ornamental shrub	No				1
Oxalidaceae							
Averrhoa carambola L.	Carambola	Fruti tree	Yes	1	1		
Poacaeae							
Bambusa vulgaris J.C. Wendl.	Golden bamboo	Ornamental	No				1
Phyllostachys nigra (Lodd. & Lindl.) Munro	Black bamboo	Ornamental	No				1
Polygonaceae							
Coccoloba unifera (L.) L.	Sea grape	Native-ornamental tree	No				1
Rosaceae							
Eriobotrya japonica (Thunb.) Lindl.	Loquat	Fruit tree	No				1
Rubiceae							
Gardenia jasminoides Ellis	Gardenia	Ornamental shrub	Yes		1		

TABLE 1. (CONTINUED) PLANTS EXAMINED FOR LOBATE LAC SCALE INFESTATION IN A FT. LAUDERDALE RESIDENTIAL YARD DURING JULY 2002.

Family Species	Common name	Type of plant	Infested	Number infested			
				High	Medium	Light	None
Hamelia patens Jacq.	Firebush	Native-ornamental shrub	Yes		1		
Ixora coccinea L.	Ixora	Ornamental shrub	No				3
Psychotria nervosa Sw.	Wild coffee	Native-ornamental shrub	Yes	2	5	2	2
Rutaceae							
Citrus X.	Grapefruit	Fruit tree	Yes			1	
Citrus X. *tangelo*	Tangelo	Fruit tree	No				1
Citrus sinensis (L.) Osbeck	Sweet orange	Fruit tree	No				1
Clausena lansium (Lour.) Skeels	Wampi	Fruit tree	Yes			1	
Fortunella japonicum (Thunb.) Swingle	Kumquat	Fruit tree	Yes			1	
Murraya paniculata (L.) Jack	Orange jasmine	Ornamental shrub	No				1
Zanthoxylum fagara (L.) Sarg.	Wild lime	Native shrub	No				1
Sapindaceae							
Dimocarpus longan Lour.	Longan	Fruit tree	No				1
Litchi sinensis Sonn.	Lychee	Fruit tree	Yes		1		1
Sapotaceae							
Manilkara zapota (L.) Van Royen	Sapodilla	Fruit tree	No				1
Synsepalum dulcificum (Schumach. & Thonn.) Daniell	Miracle fruit	Fruit shrub	Yes	1	1		
Solanaceae							
Brunfelsia sp.	None	Ornamental shrub	Yes			1	
Brunfelsia lactea Krug. Urb.	None	Ornamental shrub	No				1
Brunfelsia nitda Benth.	Lady of the night	Ornamental shrub	Yes		1		
Cestrum nocturnum L.	Night blooming jasmine	Ornamental shrub	Yes			1	
Verbenaceae							
Citharexylum spinosum L.	Fiddlewood	Native-ornamental shrub	No				1
Vitaceae							
Parthenocissus quinquefolia (L.) Planch.	Virginia creeper	Native vine	Yes			1	

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may be difficult, cost prohibitive or inappropriate because of potential harm to non-target organisms. Indeed, preliminary examination of several preserves, such as Secret Woods Nature Center in Broward County, indicates a serious level of infestation of native species (Howard, unpublished data; Pemberton, unpublished data). During October and November 2002, the lobate lac scale was discovered in Everglades National Park, Big Cypress National Wildlife Refuge and Loxahatchee National Wildlife Refuge (Pemberton, unpublished data). For additional information on this important pest, including known host plants as of October 2002, see the recently posted Featured Creatures website (Howard et al. 2002). Biological control may offer a long term solution (Pemberton 2003).

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Summary

A recent insect invader in South Florida, the lobate lac scale (*Paratachardina lobata lobata*) attacked 55% (37/67) of the plant species in 63% (19/30) families at a sampled site. Many important plants in southern Florida were attacked including: tropical fruits (grapefruit, mango, lychee and sugar apple), native plants (wild coffee, laurel oak and wax myrtle), and important landscape trees and shrubs (black olive, hibiscus, Surinam cherry, and gardenia). Some plants such as wax myrtle are killed by the scale. Research to develop control methods is urgently needed.

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