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SCIENTIFIC NOTE: *LAGERSTROEMIA SPECIOSA* (L.) PERS. (LYTHRACEAE), A NEW HOST FOR THE DEFOLIATOR *OIKETICUS KIRBYI* GUILDING, [1827] (LEPIDOPTERA: PSYCHIDAE)

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Abstract - The native vegetation of the Zona da Mata region in Minas Gerais, Brazil has largely been replaced by coffee plantations. Coffee, *Coffea* spp. (L.) (Rubiaceae), is the preferred host of the bagworm *Oiketicus kirbyi* Guilding, [1827] (Lepidoptera: Psychidae) in Brazil. This insect was found to cause damage to plants of *Lagerstroemia speciosa* (L.) Pers. (Lythraceae) in the Municipality of Viçosa, Minas Gerais, Brazil. Three individuals of various sizes were found in seven trees planted along a parking lot. The branches containing the insects were collected, brought to the laboratory, and transferred to plastic pots (1.0 L) provided with a cotton wool pad moistened with distilled water. The caterpillars, of nocturnal habit, were observed partly emerging from the larval cases to feed on leaves. The biggest larval case was opened, which contained a caterpillar that was identified and deposited in the Universidade Federal de Viçosa (UFV) collections. This is the first report of *O. kirby* defoliating *L. speciosa*, a plant grown in parking lot and gardens to provide shade and as an ornamental plant for flower production. *Oiketicus kirby* should be monitored on *L. speciosa* to determine its potential economic impact on this plant.

Key words: bagworm, giant crape-myrtle, ornamental plant, tropical region, Zona da Mata region

INTRODUCTION

The Zona da Mata region is located in the southeast of Minas Gerais, Brazil, covering an area of 36,058 km^2, accounting for 6.2 % of this state (Resende et al., 2009). Historically, its native vegetation was tropical forest, with dense tree cover, and represented part of the Atlantic Forest region (Portugal et al., 2010). These forests were reduced to small patches and shrubs on steep slopes, and were replaced over time by coffee plantations [*Coffea* spp. (L.) (Rubiaceae)], pastures (Poaceae) and other crops (Souza et al., 2009). The terrain of the Zona da Mata region is uneven, with many hills and narrow valleys and some mountains formed of ancient crystalline rocks. The altitude ranges from 100 m in the Rio Pomba and Paraíba do Sul valleys to 1,889 m in the most mountainous region (Nunes et al., 2009). The tropical climate has hot summers with temperatures reaching 25 ºC and lower temperatures at altitudes above 1,000 m above sea level (Santana et al., 2010). The rainfall varies from 1,200 to 1,400 mm (Reis et al., 2007).

Giant Crape-myrtle, *Lagerstroemia speciosa* (L.) Pers. (Lythraceae) is native to tropical southern Asia (Ellis et al., 2007), being cultivated in southern Asia, India and Philippines and in tropical and subtropical regions as an ornamental plant (Hashim & Hughes, 2010). The attractiveness of *L. speciosa*, with numerous panicles and each flower with six white to purple petals and foliage suitable for shade in parking lots, has increased its cultivation in cities in the Zona da Mata region. In addition, pruned branches of this plant can be composted and used as fertilizer (Sannigrahi, 2009). This plant is also valued for its medicinal qualities. Extract of *L. speciosa* leaves is used as a natural health supplement and may support blood sugar balance and aid weight loss. The leaves of the *L. speciosa* and other parts are widely used in the Philippines, Taiwan, and Japan as a tea preparation. This tea is largely consumed because of its various medicinal properties, especially regarding the kidney (e.g. for dissolving kidney stones, for kidney cleansing, and kidney health in general) (Unno et al., 2000). Moreover, improved varieties of *L. speciosa* have flowers with higher durability, resistance to pests and to environmental factors. However, this plant can be damaged by sucking and chewing pests, such as aphid *Sarucallis kahawaluokalani* Kirkaldy, [1907] (Hemiptera: Aphididae), beetles *Altica litigata* Fall, [1910] (Coleoptera: Chrysomelidae) and diseases (Pettis & Braman, 2007; Herbert et al., 2009).

Caterpillars of *Oiketicus kirbyi* Guilding, [1827] (Lepidoptera: Psychidae) build a self-enclosing bag or case with silk and pieces of plants for protection (Rhainds et al., 2009). In tropical America this insect has been found to cause significant damage to coffee leaves, but also feeds on plants of the Aquifoliaceae, Apocynaceae, Arecaceae, Betulaceae, Bignoniaceae, Caprifoliaceae, Casuarinaceae, Clusiaceae, Combretaceae, Ebenaceae, Erythroxylaceae, Euphorbiaceae, Lamiaceae, Laureaceae, Fabaceae, Malpighiaceae, Malvaceae, Myrtaceae, Moraceae, Musaceae, Palmaceae, Pinaceae, Polygonaceae, Rhizophoraceae, Rosaceae, Rubiaceae, Rutaceae, Sapindaceae, Ulmaceae, Vochysiaceae, and Zygophyllaceae families (Stephens, 1962; Rhainds et al., 2002; Rhainds & La Rosa, 2010). In Brazil, it feeds on *Eriobotrya japonica* (Thunb.) Lindl. (Rosaceae), *Eucalyptus* spp. (Myrtaceae), *Tectona grandis* L. (Lamiaceae), and *Terminalia catappa* L. (Combretaceae) and is considered a polyphagous pest (Gara et al., 1990; Rhainds et al., 2008; Rhainds & Sadof, 2009).

The aim of this paper is to report damage by *O. kirby* on *L. speciosa* in the Zona da Mata region in Viçosa, Minas Gerais, Brazil.

MATERIALS AND METHODS

Three larval cases of different sizes, made from silk and plant material (Figs. 1A and 1B), were found on March, 3, 2010 on a *L. speciosa* tree (Fig. 2) in a parking lot near the Departamento

Table 1. Host plants of *Oiketicus kirbyi.*

Host plants	Family	Country	References
Artocarpus heterophyllus	Moraceae	Cuba	Núñez, 2006
Bactris gasipaes	Arecaceae	Costa Rica	Rhainds et al., 1996
Bauhinia sp.	Fabaceae	U.S.A.	Jones & Parks, 1928
Bauhinia variegata	Fabaceae	Brazil	Garcia, 1999
Bernardia myricaefolia	Euphorbiaceae	U.S.A.	Davis, 1964
Byrsonima sericea	Malpighiaceae	Brazil	Flinte et al., 2006
Calophyllum antillanum	Clusiaceae	Cuba	Núñez, 2006
Casuarina equisetifolia	Casuarinaceae	Cuba	Núñez, 2006
Celtis laevigata	Ulmaceae	Cameroon	Davis, 1964
Citrus spp.	Rutaceae	Cuba	Núñez, 2006
Citrus sinensis var. Natal	Rutaceae	Brazil	Gravena & Almeida, 1982
Citrus sinensis var. Valência	Rutaceae	Brazil	Gravena & Almeida, 1982
Coccoloba uvifera	Polygonaceae	Cuba	Núñez, 2006
Cocos nucifera	Arecaceae	Costa Rica	Rhainds et al., 1995a
Coffea spp.	Rubiaceae	Brazil	Gravena & Almeida, 1982
Coffea arabica	Rubiaceae	Cuba	Núñez, 2006
Cupania americana	Sapindaceae	Cuba	Núñez, 2006
Diospyros texana	Ebenaceae	U.S.A.	Davis, 1964
Elaeis guineensis	Arecaceae	Costa Rica	Rhainds et al., 1995b
Eryobothrya japonica	Rosaceae	Cameroon	Davis, 1964
Erythroxylum tortuosum	Erythroxylaceae	Brazil	Diniz & Morais
Eucalyptus spp.	Myrtaceae	Brazil	Arce et al., 1987
Eucalyptus urophylla	Myrtaceae	Brazil	Pereira et al., 2001
Eucalyptus urograndis	Myrtaceae	Brazil	Peres Filho et al., 2009
Ilex paraguariensis	Aquifoliaceae	Brazil	Iede & Machado, 1989
Ixora coccinea	Rubiaceae	Cuba	Núñez, 2006
Kielmeyera coriaceae	Clusiaceae	Brazil	Diniz et al., 1999
Leucaena leucocephala	Fabaceae	U.S.A.	Davis, 1964
Leucaena pulverulenta	Fabaceae	Cameroon	Davis, 1964
Lonicera japonica	Caprifoliaceae	Cameroon	Davis, 1964
Mimosa pudica	Fabaceae	U.S.A.	Jones & Parks, 1928
Musa spp.	Musaceae	Costa Rica	Stephens, 1962
Musa AAB var. Horn	Musaceae	Venezuela	Ramírez et al., 1999
Musa paradisiaca	Musaceae	Cuba	Núñez, 2006
Ostrya sp.	Betulaceae	U.S.A.	Jones & Parks, 1928
Persea sp.	Lauraceae	Cuba	Núñez, 2006
Persea sp.	Lauraceae	Peru	Rhainds & La Rosa, 2010
Persea americana	Lauraceae	Cameroon	Davis, 1964
Philodendron sp.	Areaceae	U.S.A.	Jones & Parks, 1928
Porlieria angustifolia	Zygophyllaceae	U.S.A.	Davis, 1964
Prosopis glandulosa	Fabaceae	Cameroon	Davis, 1964
Psidium guajava	Myrtaceae	Cuba	Núñez, 2006
Pyracantha coccinea	Rosaceae	Cameroon	Davis, 1964
Qualea multiflora	Vochysiaceae	Brazil	Diniz & Morais, 1997
Robinia sp.	Fabaceae	U.S.A.	Jones & Parks, 1928
Spathodea campanulata	Bignoniaceae	Brazil	Garcia, 1999
Tabebuia rosea	Bignoniaceae	Colombia	Madrigal, 1986
Tectona grandis	Lamiaceae	Brazil	Ferreira et al., 2008
Terminalia sp.	Combretaceae	Cuba	Núñez, 2006
Terminalia catappa	Combretaceae	Brazil	Garcia, 1999
Theobroma cacao	Malvaceae	Trinidad	Kirkpatrick, 1953
Thuja orientalis	Pinaceae	Cameroon	Davis, 1964
Rhizophora spp.	Rhizophoraceae	Ecuador	Gara et al., 1990
Rosa sp.	Rosaceae	Cameroon	Davis, 1964
Ulmus sp.	Ulmaceae	U.S.A.	Jones & Parks, 1928
Vinca sp.	Apocynaceae	U.S.A.	Jones & Parks, 1928

Fig. 1. *Oiketicus kirbyi*: case of late instar larva (A) and smaller case of young larva (B). Zona da Mata region in Viçosa, Minas Gerais, Brazil.

Fig. 2. *Lagerstroemia speciosa*, host plant.

de Entomologia of Universidade Federal de Viçosa (UFV) in Viçosa, Minas Gerais, Brazil (20º 45' S, 42º 51' W, 651 m). Seven trees up to 4 years in age and 6 m tall were searched. This area has little sharp relief, fragments of secondary forest and diversified fauna (Pereira et al., 2009a, b, 2010).

Branches of *L. speciosa* with cases were removed, brought to the Laboratório de Controle Biológico de Insetos (LCBI) of the Departamento de Biologia Animal (DBA) of UFV and transferred to plastic pots (1.0 L) with cut ends placed in cotton wool pads moistened with distilled water. The material was maintained at a temperature of 25 ± 1 ºC, 12 h photoperiod and relative air humidity of 70 ± 10 %. The caterpillars, of nocturnal habit, partly emerged from the cases to feed on leaves of *L. speciosa*. Caterpillars of the two smaller cases died and were discarded. The biggest case was opened and was found to contain a caterpillar that was preserved and identified by comparison with material deposited in the UFV collections and with the published account by Davis (1964). Taxonomist Dr. Paulo Sérgio Fiuza Ferreira of UFV identified the material collected from *L. speciosa* (caterpillars and their larval cases). Characteristics of length, width, shape, silk, and pieces of plant material used in the tree cases were compared, and it was concluded that they belonged to the same species. Morphological aspects of the head capsule, lateral stemmata, spiracles, thoracic legs, prolegs and crochets, besides the length and color of caterpillar, were used for species identification.

RESULTS AND DISCUSSION

Fragments of plant material in the cases as opposed to silk only or other materials are characteristics of the macro-moth family Psychidae (Davis, 1964). The three larval cases collected were of this type and thus recognized as Psychidae. The older case was 85 mm long and had a diameter of 27.5 mm. This case was heavily constructed of short sections of twigs and a few tiny leaf fragments arranged in circular pattern around the bag. A thin layer of grayish-brown silk covered the entire structure, concealing all but the outline of the plant fragments.

The bigger caterpillar had a grayish color and was 47 mm long, with black spots of irregular size and shape located on the dorsum of the three thoracic segments and head, suggesting it was a female (Davis, 1964). These spots are possibly for camouflage, since they only appear on the parts exposed during feeding, locomotion, and during construction of cases (Davis, 1964). The thoracic legs were well-developed in contrast to the abdominal and anal prolegs. Characteristics of the head capsule, lateral stemmata, spiracles, thoracic legs, prolegs and crochets along with length and color were compared with determined material in UFV and the descriptive account by Davis (1964) in order to confirm the identity of the species.

Based on the aforementioned characters, the caterpillar found on *L. speciosa* was identified as the bagworm *O. kirbyi*. The association of *O. kirby* with this plant adds to the more than 50 host plants previously known for this polyphagous species (Table 1) and confirms its Neotropical distribution. Cultivars of *Lagerstroemia* spp. were found to be resistant to damage caused by the aphid *S. kahawaluokalani* (Herbert et al., 2009). Our observations on damage caused by this insect suggest it

has the potential to become a pest of *L. speciosa*. This is a bold conclusion based on finding only three larvae. However, further studies with other cultivars are needed.

The occurrence of *O. kirby* in Viçosa can be explained by the large area of coffee plantations in this municipality, since *Coffea* spp. is the preferred host for this insect (Ellis et al., 2007). Moreover, the egg stage of *O. kirby* is of shorter duration in tropical regions, indicating its adaptation to this region and resulting in greater fecundity in the Neotropical region (Mishra, 1978). The species is less common in temperate regions (Morden & Waldbauer, 1980) where it hibernates in the egg stage (Neal et al., 1987). *Oiketicus kirbyi* caterpillars draw most nutrients from leaves of plants with high pH levels (Rhainds et al., 2009). Although the chemical composition of plants may vary depending on environmental factors, which may prevent or reduce insect damage in some seasons (Sidhu et al., 2004), a comparative study of host pH levels and relative growth of *O. kirby* on *L. speciosa* and other potential ornamental hosts could be useful for the evaluation of the potential for pest damage.

This is the first report of *O. kirby* defoliating *L. speciosa*. We suggest *Lagerstroemia speciosa* should be monitored for *O. kirby* presence on a permanent basis. Its potential for defoliation should be evaluated and control measures developed, if necessary, to minimize the impact to these ornamental plants.

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