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Source: Florida Entomologist, 97(2) : 846-848

Published By: Florida Entomological Society

URL: https://doi.org/10.1653/024.097.0276

RANGE EXPANSION OF THE LITCHI ERINOSE MITE *ACERIA LITCHII* (ACARI: ERIOPHYIDAE) IN BRAZIL

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Litchi (*Litchi chinensis* Sonn.) being indigenous to the moist forests of China, belongs to the Sapindaceae family, which has approximately 150 genera and 2,000 species in the tropics and subtropics (Paull & Duarte 2011). *Paullinia cupana* Kunth is the best known species of this family in Brazil. *Litchi chinensis* needs winter cooling to stimulate its flowering, and it is cultivated in most parts of the world including Brazil and other Latin American countries (Diczbalis 2011; Paull & Duarte 2011). Commercial litchi orchards were initiated in Brazil in the 1970-80s. The major cultivar ('Bengal') produces fruits from Nov to Jan (Pimentel & Celim 2013) and its fresh fruits are sold in domestic markets at Christmas.

Fifty-eight pest species have been recorded on litchi trees worldwide, including lepidopterans, scales, stink bugs, fruit flies, and eriophiid mites, and these pest mainly damage the flowers and fruits (Waite 2012). The litchi erinose mite (LEM), *Aceria litchii* (Keifer) (Acari: Eriophyidae) is a major pest of litchi varieties (Menzel 2002; Paull & Duarte 2011). LEM is not visible to the naked eye. LEM is specific to litchi, affecting new shoots on the entire tree during severe infestations (Paull & Duarte 2011), and causing abnormal development and premature defoliation (Waite 2012). Litchi plants with severe erinose symptoms in young and developing leaves were detected in Brazil in Jan 2008 in an orchard of 3,000 thirteen-yr-old litchi plants of the cultivar 'Bengal' in the municipality of Limeira, São Paulo State. A dense population of this mite was detected during the litchi fruiting period, and this represents the first report of *A. litchii* in South America (Picoli et al. 2010; Raga et al. 2010).

The detection of LEM in Espírito Santo State, Brazil (S 20° 20' 26" -W 41° 06' 59", 750 m asl) in Dec 2012 represents its first range expansion in this country. The leaves (Fig. 1A), and mature litchi fruits showed mild erinose mite symptoms, but another orchard nearby had no symptoms. Infested litchi leaves with erinose mite symptoms (Fig. 1B) were collected, placed in Kraft paper bags and transported to the regional laboratory of entomology of INCAPER (Instituto Capixaba de Pesquisa, Assistência Técnica e Extensão Rural) from Dec 2012 to Feb 2013 to identify the mite species. These leaves were left for 2 h under direct sunlight to force the mites to leave the erineum (Waite 1992), the latter being an abnormal felty growth of hairs from the leaf epidermis. Live mites were observed under the microscope, and infested leaves were cut into 4 cm^2 pieces, preserved in 70% alcohol, and sent to Dr. Gilberto José de Moraes of the Laboratory of Entomology and Acarology, Escola Superior de Agricultura Luiz de Queiróz, University of São Paulo (ESALQ-USP), who identified them as *Aceria litchii* (Keifer) (Acari: Eriophyidae) (Fig. 1C). Leaves from trees of the second orchard produced by air-layering were collected, but they showed no LEM or erinose mite symptoms.

Insecticide sprays to control litchi pests, such as *Tessaratoma papillosa* Drury (Hemiptera: Tessaratomidae) (Zeng et al. 2001) can increase LEM populations (PIP 2011). However, no insecticides or fungicides were sprayed in the LEM-infested area. Pruning and burning of affected twigs were the adopted control measures, particularly for severely infested litchi trees. Pruning and burning reduced LEM symptoms up to 3 months when new shoots presented symptoms. Three sprays of wettable sulphur, permitted for use on organic crops, at the 0.4% rate at 15-day-intervals were used. No pesticide is registered to control litchi pests in Brazil, although chemical products are used to control this mite in other countries (Schulte et al. 2007; Brasil 2013).

Predators are important for LEM management, particularly those of the Phytoseiidae family, but Waite (2012) reported them to have low efficiency on *A. litchii*. *Amblyseius* spp., *Euseius* spp., *Iphiseiodes* spp., *Phytoseius* spp., *Okisieus*

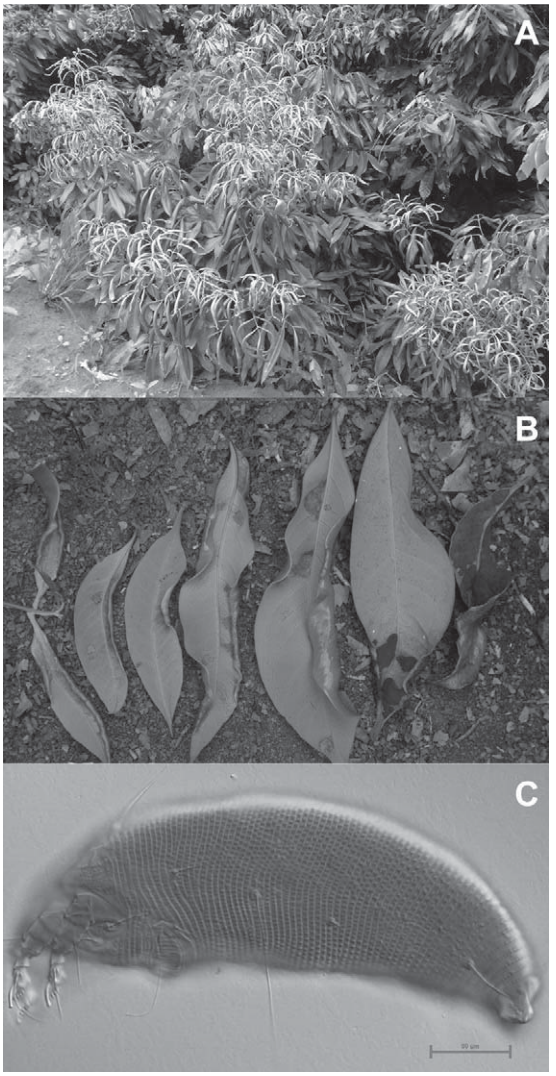

Fig. 1. A. Eighteen year old litchi tree damaged by *Aceria litchii* (Acari: Eriophyidae); B. Variations in leaf maturation and damage; and C., *Aceria litchii*. The infested orchard was located in the municipality of Venda Nova do Imigrante, Espírito Santo State, Brazil.

spp., *Typhlodromus* spp. (Acari: Phytoseiidae), and *Agistemus* spp. (Acari: Stigmaeidae) are associated with LEM worldwide, including Brazil (Picoli et al. 2010). The number of species and endemism of predatory Phytoseiidae mites are high in the Neotropical region (Tixier et al. 2008). Detection of predatory mites is important for the biological control of *A. litchii*.

LEM and its damage should be sampled in the litchi orchards in Espírito Santo State, Brazil. The expansion of the LEM on litchi into a second Brazilian state and measures for its management are presented.

Acknowledgments

To the "Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)", "Coordenação do Aperfeiçoamento de Pessoal de Nível Superior (CAPES)", "Fundação de Amparo à Pesquisa do Espírito Santo (FAPES)", and "Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG)" for financial support. To Dr. Gilberto José de Moraes for the mite identification. Global Edico Services edited and proofread this manuscript.

Summary

Litchi (*Litchi chinensis* Sonn.) is cultivated in subtropical and tropical regions, and in Brazil, commercial orchards began in the 1970-80s. The litchi erinose mite (LEM), *Aceria litchii* (Keifer) (Acari: Eriophyidae), is a pest of litchi worldwide. In Brazil, LEM was first reported in this crop in São Paulo State in 2008, and Espírito Santo is the second Brazilian state with infestation of this mite discovered in a 18-year-old orchard of 150 plants of the litchi cultivar 'Bengal'. Cultural and chemical measures for LEM management are presented, and this is the first range expansion of LEM into Espírito Santo State, Brazil.

Key Words: Bengal, Eriophyidae, *Litchi chinensis*, lychee, management, range expansion

Resumo

Lichia (*Litchi chinensis* Sonn.) é cultivada em regiões tropicais e subtropicais e no Brasil pomares comerciais desta planta começaram na década de 1970-80. O ácaro da erinose da lichia (LEM), *Aceria litchii* (Keifer) (Acari: Eriophyidae) é praga importante desta planta no mundo. No Brasil, LEM foi relatado pela primeira vez no Estado de São Paulo em 2008 e o Espírito Santo *é* o segundo estado brasileiro a confirmar a infestação com este ácaro em pomar de 18 anos, com 150 plantas de lichia, cultivar Bengal. Medidas para o manejo do LEM são apresentadas e este e o primeiro relato da expansão do LEM no Estado do Espírito Santo, Brasil.

Palavras-Chave: Bengal, Eriophyidae, expansão da área, lichia, *Litchi chinensis*, manejo

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