

Scientific Note

Parasitism of *Aleurodicus pseudugesii* Martin, 2008 (Hemiptera: Aleyrodidae) by *Aleuroctonus marki* Hansson & LaSalle, 2003 (Hymenoptera: Eulophidae) in coconut trees in the state of Pará, Brazil

Aloyséia C. S. Noronha^{1✉}, Valmir A. Costa², Aurino F. Lima³, Leandro C. Silva^{4†},
Leonardo S. Duarte⁴, Regiane C. Vieira⁴

¹Embrapa Amazônia Oriental, Belém, PA, Brazil. ²Instituto Biológico, Campinas, SP, Brazil. ³Universidade Federal Rural do Rio de Janeiro, Seropédica, RJ, Brazil. ⁴Universidade Federal Rural da Amazônia, Belém, PA, Brazil.

✉Corresponding author: aloyseia.noronha@embrapa.br

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Abstract. The aim of this note is to report the parasitism of *Aleurodicus pseudugesii* Martin, 2008 (Hemiptera: Aleyrodidae) nymphs by *Aleuroctonus marki* Hansson & LaSalle, 2003 (Hymenoptera: Eulophidae) in coconut palm *Cocos nucifera* L. (Arecaceae) in Santa Izabel do Pará, a municipality in the Eastern Amazon. This is the first recorded instance of a parasitoid species in *A. pseudugesii*.

Keywords: *Cocos nucifera*, biological control, whitefly.

The whitefly *Aleurodicus pseudugesii* Martin, 2008 (Hemiptera: Aleyrodidae) was first identified from specimens found on coconut trees in Ecuador and Peru (Martin 2008). In Brazil, it has been reported damaging coconut trees (*Cocos nucifera* L. - Arecaceae) in states in the Northeast (Alagoas, Bahia, Ceará, Paraíba, and Sergipe), North (in the northern region of Pará), and Southeast (in the southeastern region of Rio de Janeiro) (Ferreira et al. 2011; Omena et al. 2012).

Infestation of *A. pseudugesii* on coconut palms is characterized by the presence of the insect on the underside of the plant's crown leaves. This leads to a whitish appearance due to a waxy white layer and elongated translucent sugary threads secreted by the insects (Fig. 1). This, in turn, favors the development of the fungus *Capnodium* spp. on the upper surface of the leaves (Ferreira et al. 2011; Omena et al. 2012). The presence of the fungus affects the plant's photosynthesis process, which can lead to a reduction in fruit production. *Aleurodicus pseudugesii* can cause significant losses in coconut production and contribute to an increase in production costs (Ferreira et al. 2011). In addition to coconut palms, *A. pseudugesii* has been found to infest other plants, such as banana trees, *Inga edulis* Mart., *Dieffenbachia amoena* Bull., *Dypsis lutescens* (H.Wendl.) Beentje & J. Dransf., *Leea rubra* Spreng. ex Blume, *Manihot esculenta* Crantz, *Rollinia mucosa* Jacq., and *Spathodea campanulata* P. Beauv, in the state of Rio de Janeiro (Trindade et al. 2012).

Between August 2018 and July 2019, evaluations were conducted to assess the presence of arthropods on the leaves of coconut plants, specifically the dwarf green variety, aged six to seven years, in a commercial plantation of SOCOCO S.A. Agroindústria da Amazônia, Reunidas Farm, located in the municipality of Santa Izabel do Pará (01°13'40.16"S 48°02'5.35"W), in the Metropolitan mesoregion of the state of Pará, Brazil. During the evaluations, leaf samples with nymphs and adults of *A. pseudugesii* were collected. To obtain parasitoids, parts of the leaves with whitefly nymphs showing black coloring, an indicator of parasitism, were placed in 30 mL glass vials lined with non-moistened filter paper at the bottom and sealed with PVC film. Observations were made daily for 20 days to monitor the emergence of parasitoids. The specimens obtained were initially preserved in vials containing 70% ethanol and then dried in a Leica CPD300 critical point dryer and mounted on cardboard points. Identification was carried out following the guidelines of Hansson & LaSalle (2003).

Fourteen specimens of parasitoids that emerged from *A. pseudugesii* nymphs were identified as belonging to the species *Aleuroctonus marki* Hansson & LaSalle, 2003 (Hymenoptera: Eulophidae) (Fig. 2). Of these, four specimens were deposited in the "Oscar Monte" Collection of Entomophagous Insects of the Instituto Biológico in Campinas, São Paulo state (IB-CBE 001867 to IB-CBE 001870) and ten specimens were deposited in the Entomological Collection of Embrapa Amazônia Oriental (CPATU-ENTO) in Belém, Pará.

The *Aleuroctonus* LaSalle & Schauff, 1994 genus comprises four distinct species: *Aleuroctonus marki*, *Aleuroctonus metallicus* Hansson & LaSalle, 2003, *Aleuroctonus latiscapus* Hansson & LaSalle, 2003, and *Aleuroctonus vittatus* (Dozier, 1933). The first three species are commonly found in association with whiteflies on coconut plants, while the last is typically found on cassava (*M. esculenta*) and coconut plants (Hansson & LaSalle 2003; Vásquez-Ordóñez et al. 2015). Adults of *A. marki* range from 0.9 to 1.1 mm in size (females: 1.0-1.1 mm and males 0.9-1.0 mm). They have white antennae, dark and metallic anterior coxa, and white middle and posterior coxa, with white femora, tibiae, and tarsi. The head and mesosoma are dark with slight bluish metallic reflections. The gaster is dark with a pale yellow to white spot at the base and the posterior margin of the spot has a median incision. The fore wings are hyaline. The eyes have setae and the internal margins diverge towards the oral foramen. The frontal suture is present only medially and the antenna has all the funicle segments transverse. The mesoscutum has numerous setae scattered over the entire surface and the median lobe has a distinct median groove in the posterior two-thirds. The axillae are located entirely in front of the scuto-scutellar sulcus and are separated from the mesoscutum by a groove (Hansson & LaSalle 2003).

Aleuroctonus marki has a neotropical distribution, occurring in Brazil, Chile, Colombia, Costa Rica, Puerto Rico, United States of America (South Florida), and the West Indies (Cayman Islands). It is known to parasitize the whitefly *Aleurodicus dispersus* Russell, 1965 (Aleyrodidae) (Hansson & LaSalle 2003; Evans 2008; Myartseva et al. 2013). In Brazil, *A. marki* was collected in the municipality of Serra do Cipó, Minas Gerais state, during a study on the interaction between insects and trophobiont ants on *Psittacanthus robustus* Mart. plants (Loranthaceae) (Freitas & Rossi 2015). This study presents the first record of *A. marki* parasitizing nymphs of *A. pseudugesii* on coconut

plants. Given the economic importance of the host and its impact on coconut production, the parasitoid could be considered an alternative for controlling this species.



Figure 1. *Aleurodicus pseudugesii* Martin, 2008 (Hemiptera: Aleyrodidae) on coconut leaf. Photo: Aloyséia C. S. Noronha

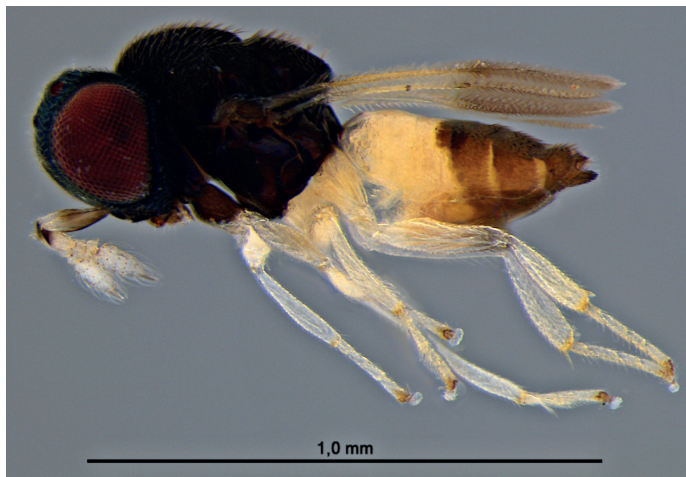


Figure 2. *Aleuroctonus marki* Hansson & LaSalle, 2003 (Hymenoptera: Eulophidae). Photo: Valmir A. Costa

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Authors' Contributions

Field activities were conducted by ACSN and LCS. Laboratory activities were conducted by ACSN, LCS, LSD, and RCV. The parasitoid species was identified by VAC. The whitefly species was identified by AFL. ACSN and VAC drafted the manuscript. All authors reviewed the manuscript.

Conflict of Interest Statement

The authors declare no conflict of interest.

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