

Living inside baskets: a new fruit tree host for *Oiketicus kirbyi* Guilding, 1927 (Lepidoptera: Psychidae) in Brazil

Vivir dentro de cestas: un nuevo árbol frutal hospedante para *Oiketicus kirbyi* Guilding, 1927 (Lepidoptera: Psychidae) en Brasil

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ZooBank: urn:lsid:zoobank.org:pub:115B1CFD-69C5-4B1E-8761-FFE5F100A99D
<https://doi.org/10.35249/rche.50.1.24.11>

Abstract. The bagworm *Oiketicus kirbyi* is an extremely polyphagous insect pest that attacks several crops of economic importance in various Brazilian regions. In this paper, we are made the first record of *O. kirbyi* in Maranhão state, northeast Brazil region. Additionally, the Jabuticabeira tree *Plinia grandifolia*, an economically important Brazilian fruit tree, is presented as a new fruit tree host for *O. kirbyi*. Two larvae specimens of this species were collected in a garden of a residential condominium, on an individual of the *P. grandifolia*. This found is of great importance given the economic relevance of Jabuticabeira tree and the high level of damage that can be caused by *O. kirbyi* larvae on fruits production.

Key words: Bagworm; moth; pest insect.

Abstract. La polilla *Oiketicus kirbyi* es un insecto plaga extremadamente polífago que ataca varios cultivos de importancia económica en diversas regiones de Brasil. En esta comunicación se realiza el primer registro de *O. kirbyi* en el estado de Maranhão, región noreste de Brasil. Además, el árbol de Jabuticabeira *Plinia grandifolia*, un frutal brasileño de importancia económica, se presenta como un nuevo árbol hospedante de *O. kirbyi*. Se recolectaron dos larvas de esta especie en el jardín de un condominio residencial, sobre un individuo de *P. grandifolia*. Este hallazgo es de gran importancia dada la relevancia económica de la Jabuticabeira y el alto nivel de daño que pueden causar las larvas de *O. kirbyi* en la producción de frutos.

Palabras clave: Insecto plaga; oruga del cesto; polilla.

Psychidae is a large and diverse family of Lepidoptera with approximately 300 genera and 1,000 worldwide species (Rhainds *et al.* 2009). Currently, Psychidae is composed of ten sub-families (Naryciinae, Taleporiinae, Pseudarbelinae, Scoriodytinae, Placodrominae, Typhoniinae, Psychinae, Epichnopteriginae, Metisinae and Oiketicinae) characterized, in part, by the wide range of morphological and behavioral plasticity present in the adult female (Rhainds *et al.* 2009).

Received 4 January 2024 / Accepted 28 February 2024 / Published online 31 March 2024

Responsible Editor: José Mondaca E.

In Brazil, Psychidae is represented by fifteen species belonging to the subfamilies Arrenophaninae and Oiketicinae. The subfamily Arrenophaninae has eight species distributed among the genera *Arrenophanes* Walshinham, 1913, *Cnossostages* Zellar, 1863 and *Dysoptus* Walshinham, 1914, recorded in all Brazilian regions, while the subfamily Oiketicinae has seven species distributed among the genera *Animula* Herrich-Schäffer, 1858, *Lumacra* Davis, 1964, *Oiketicus* Guilding, 1827 and *Psychoglene* Felder & Rogenhofer, 1874, with records of species in North, Northeast, Southeast, and South Brazilian regions (Carneiro 2023).

The Psychinae fauna of the Brazilian northeast region is poorly known, with records of two species: *Arrenophanes perspicilla* (Stoll, 1790) and *Oiketicus kirbyi* (Guilding, 1827). The species *A. perspicilla* occurs in Alagoas, Bahia and Ceará state, while *O. kirbyi* occurs in Alagoas and Pernambuco (Carneiro 2023; Guzzo and Lima 2020).

In this paper, we aim to contribute to the understanding of the Psychidae distributions in Brazil by providing the first records of *Oiketicus kirbyi* in the state of Maranhão. Additionally, we are presenting the fruit tree *Plinia grandifolia* (Mattos) Sobral, 1994 (Jabuticabeira tree) as a new fruit tree host for *O. kirbyi*.

Specimens of *O. kirbyi* were observed and collected in August 2023 in an urban area of the Paço do Lumiar municipality, Maranhão. Maranhão is the second largest state of the Northeast region of Brazil, comprising a surface area of 331,983.29 km². It borders the Atlantic Ocean to the north, Tocantins to the south, Piauí to the east and Pará to the west (Fig. 1). Paço do Lumiar municipality is located in the eastern part of the island of São Luis, between the geographic coordinates 2°27'42"S and 44°3'37"W. Comprising a surface area of 122 km², it is limited by the Raposa municipality to the north, east and west, and by the São José de Ribamar municipality to the south (Fig. 1). The area sits below 51 meters above sea level (m a.s.l.) in a characterizable Amazon biome. The local vegetation is composed mainly by shrubs/growing vegetation (58.9%), arboreal/shrubs vegetation (29.16%) and mangrove forest (8.45%) (Silva and Silva 2023). Disturbed areas without vegetation cover represent approximately 18.8% of the municipality total area (Silva and Silva 2023). Photographs of the species were taken using a Motorola moto g71 cell phone. The map showing the collection site was created using the free software QGIS 3.28.0 'Firenze' (QGIS Development Team 2023). The identification of the *O. kirbyi* species was made based on the description and illustrations provided by Campos-Arce *et al.* (1987). Voucher specimens were deposited in the Entomological Collection Iraci Paiva Coelho, of the Centro de Ciências Agrárias of the Universidade Estadual do Maranhão, São Luis, state of Maranhão, Brazil.

Two larvae specimens of *O. kirbyi* were collected in a garden of a residential condominium, on an individual of the tree *P. grandifolia*, commonly known as "Jabuticabeira". *Oiketicus kirbyi*, a bagworm known in Brazil by the common name of "bicho-do-cesto" (= basket's animal), constructs a basket-shaped bag using silk and plant material during its larval stage (Fig. 2A). Larva can be recognized by the brown thorax with longitudinal black stripes, by the well-developed thoracic legs and by the reduced abdominal and anal legs (Fig. 2B). It feeds on young leaves and it also preying the thinnest branches of the tree branches using them in the construction of the bag soon after the larva eclosion. The bag is carried by the larva throughout all its development and is progressively enlarged as larva grow older (Campos-Arce *et al.* 1987). Completed the larval stage both males and females pupate inside of the bag and after pupal stage, the male transforms into an adult winged moth with an average wingspan of 42 mm, brown general color body densely covered with scales, bipectinate antennae, and atrophied mouthparts, while the female transforms into an apterous and without scales adult moth, presenting a very small head without mouthparts and antennae, and atrophied legs, maintaining the larval general appearance. After emergence the male adults fly out and disperse while the female adult remains into the case where it mates and deposits, in average, 5,000 eggs. After hatching the newly

hatched larvae leave the bag by a silk thread and are dispersed by the wind to the other host plant (Campos-Arce *et al.* 1987).



Figure 1. Map of Maranhão state, North Brazil Region, showing the Island of São Luis (red polygon) and Paço do Lumiar municipality location (blue marker). / **Figura 1.** Mapa del estado de Maranhão, Región norte de Brasil, que muestra la isla de São Luis (polígono rojo) y la ubicación del municipio de Paço do Lumiar (marcador azul).

Jaboticabeira tree belongs to the Myrtaceae family and is native to central, southern, and southeastern Brazilian regions. Due to the exuberance of their architecture and the beauty of their flowering and fruiting it can be used as an ornamental plant (Fig. 2C). Its fruits have relative economic and social importance being sold for consumption both *in natura* and in form of jellies, juices, vinegars, and liqueurs. Due to high content of antioxidant substances its fruits are useful also in the pharmaceutical and food industries (Citadin *et al.* 2010). Furthermore, in some Brazilian regions, principally in the southeastern region, fruits of the Jaboticabeira tree represent an important source of income for needy families who collect it from native plants and sell it *in natura* on the roadsides, obtaining an additional income during the harvest season (Citadin *et al.* 2010).

In the garden where we found the *O. kirbyi* specimens, besides of the Jaboticabeira tree we also identified other plants such as the fruit tree *Eugenia uniflora* L., 1753 (Pitangueira tree), and the ornamental plants *Leuconostegia bleo* (Kunth) Lodé, 1828 (*ora-pro-nobis*), *Arundina graminifolia* (D. Don) Hochr, 1910 (bamboo-orchid), *Dietes iridioides* (L.) Sweet ex Klatt, 1894 (white-moraea), *Plumeria rubra* L., 1753 (jasmim-manga, in portuguese), *Thunbergia grandiflora* Roxb, 1814 (Bengal clockvine) and many varieties of *Adenium obesum* (Forssk.) Roem. & Schult., 1819 (desert rose). Despite of the presence of other plants, including another fruit tree, *O. kirbyi* was not found on any other plant, showing its preference by the Jaboticabeira tree, being observed including preying immature fruits (Fig. 2d).



Figure 2. *Oiketicus kirbyi*. **a.** Basket-shaped bag. **b.** Dorsal view of larva. **c.** General view of Jaboticabeira tree. **d.** Immature Jaboticabeira fruit being eaten by *O. kirbyi* larva. / **Figura 2.** *Oiketicus kirbyi*. **a.** Capullo. **b.** Vista dorsal de la larva de *Oiketicus kirbyi*. **c.** Vista general del árbol de Jaboticabeira. **d.** Fruto inmaduro de Jaboticabeira siendo comido por la larva de *O. kirbyi*.

This preference of *O. kirbyi* by the Jabuticabeira tree is especially worrying since its larva is a defoliating insect. A single adult female may rise to 5,000 larvae with a long larval phase that can last up to 382 days (Stephens 1962; Baronio *et al.* 2012). During this period, larvae use leaves, twigs, flowers and fruits of the host species, both for food and for the construction of the bag and a single larva can lead to a loss of up to 1,025 cm² of leaf area in the host plant (Campos-Arce *et al.* 1987), causing a significant drop in photosynthetic capacity and consequently a reduction in productivity.

Given the economic importance of Jabuticabeira tree and the high level of damage that can be caused by *O. kirbyi* larvae, we recommend monitoring the infestation levels of the pest in both commercial and domestic orchards, aiming to develop prevention and control actions and the maintenance of fruits production at levels that are economically viable.

Author Contributions

JdLGN: Writing - original draft preparation, review and editing. **MABP:** visualization, writing – original draft preparation. **MPG:** Visualization, writing – original draft preparation. Both **JdLGN**, **MABP** and **MPG** authors contributed to the final version of the manuscript.

Acknowledgements

We are grateful to Editor José Mondaca and two anonymous reviewers by the corrections and suggestions that improved this manuscript.

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