

Scientific Note

New records of hawkmoths (Lepidoptera: Sphingidae) from Sergipe, Northeastern Brazil

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Abstract. Checklists are essential for elucidating species distributions. Hawkmoths, known for their extensive distribution, are considered cosmopolitan. However, in Brazil, surveys of Sphingidae are unevenly distributed across the region, with Northeastern Brazil being particularly under-sampled. To address the Wallacean shortfall for these species, this study presents new records of Sphingidae, thereby extending their documented distribution to Northeastern Brazil. Specimens were collected opportunistically within the campus of the Federal University of Sergipe, resting on the walls, throughout the day. Eight individuals representing six species were identified, of which two were new records for the state of Sergipe: *Eupyrrhoglossum sagra* (Poey, 1832) and *Unzela japix* (Cramer, 1776) (Lepidoptera: Sphingidae). These species are considered rare in Brazilian fauna inventories. The distribution range of *E. sagra* was extended by 388 km, with the nearest previous record in Pernambuco, whereas *U. japix* exhibited an extended range of 1,043 km, with the closest record in Piauí. This study emphasizes the biodiversity of Sergipe and highlights existing knowledge gaps concerning Sphingidae in Northeastern Brazil.

Keywords: Biodiversity, Pollinators, New Occurrence, Moths.

Understanding species distribution is crucial for evaluating the ecological roles of species within ecosystems and for informing their conservation (Ramos et al. 2021). This is particularly relevant in the Neotropical regions, where species richness and abundance increase at higher rates (Smith 2022). Therefore, inventories and checklists are fundamental for increasing biodiversity knowledge (Nobre et al. 2008; Mielke & Haxaire 2013).

Hawkmoths (Lepidoptera: Sphingidae) are robust insects of medium to large size that fly long distances in a single night (Amorim et al. 2014), being important pollinators of sphingophilous plants including wild and cultivated species (Martins & Johnson 2009; Cai et al. 2024), is the moth most studied worldwide, and has a cosmopolitan distribution (Kitching et al. 2018; Meija et al. 2020).

There are 312 species of Sphingidae in the Neotropical region, of which 200 occur in Brazil (Ramos et al. 2021; Orlandin et al. 2025). Despite this high species richness, only a few Brazilian states [Amazonas (Motta et al. 1998; Motta & Andreazze 2001; Motta & Xavier-Filho 2005), Pará (Moss 1920; Freiche 1979), Paraíba (Darrault & Schlindwein 2002; Gusmão et al. 2003; Gusmão & Creão-Duarte 2004), Ceará (Silva 1967), Rio Grande do Sul (Biezanko 1948; Specht et al. 2008), and São Paulo (Duarte et al. 2008; Vieira et al. 2015)] have conducted more than one hawkmoth survey (Haxaire 2019). Iserhard et al. (2018) and Nobre et al. (2008), highlighted the irregular distribution of surveys across Brazil, with the Northeastern region being particularly poorly surveyed (Gusmão & Creão-Duarte 2004; Primo et al. 2013). This lack of knowledge about species distribution, known as the Wallacean shortfall, limits our understanding of biogeographic patterns and constrains the scope of ecological research. Therefore, the states of Sergipe and Alagoas are considered priority areas for moth research because of the scarcity of published inventories. The state of Sergipe has only one general study of moths, which includes a few hawkmoth records (4 spp.) (Dantas et al. 2024). Therefore, this study reports two new records of Sphingidae from Sergipe, expanding the known geographic distribution of hawkmoths in Northeastern Brazil.

Sampling was conducted at the Federal University of Sergipe (UFS), São Cristóvão Campus, São Cristóvão, Sergipe, Brazil (10°55'34.62"S, 37°6'5.18"W). The University is located in the municipality of São Cristóvão, which is part of the metropolitan region of Aracaju, in the Central-Eastern part of the State of Sergipe (Fig. 1). The sampled area covers an area of 411,918 m², of which 192,000 m² are constructed areas that operate day and night (Gomes 2017; UFS 2019), including classrooms, the rectorate, campus administration, sports facilities, academic centers, libraries, social spaces, and university restaurants. These structures include small gardens with native and exotic plant species, and the campus vegetation is predominantly characterized by grass, shrubs, and sparse trees. In addition to vegetation, the campus contains circulation areas with heavy pedestrian and vehicle traffic, with approximately 25,000 individuals accessing the site daily and reduced movement at night (UFS 2024).

Sphingids were collected opportunistically when resting on building walls during the day and night from May to November 2024. All individuals were sampled using an entomological net and euthanized with an injection of 10% ammonium hydroxide ventrally between the thorax and the abdomen. The collected specimens were subsequently placed in entomological envelopes, stored in a refrigerator, and deposited in the Lepidoptera Collection of the Ecology and Biodiversity Laboratory (LEBIO) of the Department of Ecology (DECO). Specimens were identified by consulting specialized literature (Camargo et al. 2018; Martin et al. 2011).

Eight individuals belonging to six species were recorded: *Erinnyis ello* (Linnaeus, 1758), *Eumorpha vitis* (Linnaeus, 1758), *Eupyrrhoglossum sagra* Poey, 1832, *Pachylia ficus* (Linnaeus, 1758), *Unzela japix* (Cramer, 1776), and *Protambulyx strigilis* (Linnaeus, 1771). *Protambulyx strigilis* was the most abundant species, with three individuals, whereas the remaining species were represented by only one individual. *Eupyrrhoglossum sagra* (Fig. 2A) and *U. japix* (Fig. 2B) are new records from the state of Sergipe. This study provides new insights into species distribution, including new records for Sergipe and considerable range

expansion of two species in Northeastern Brazil, *E. sagra* and *U. japix*. The state of Sergipe presents a significant knowledge gap regarding the family Sphingidae, with only one published study (Dantas et al. 2024) to date.

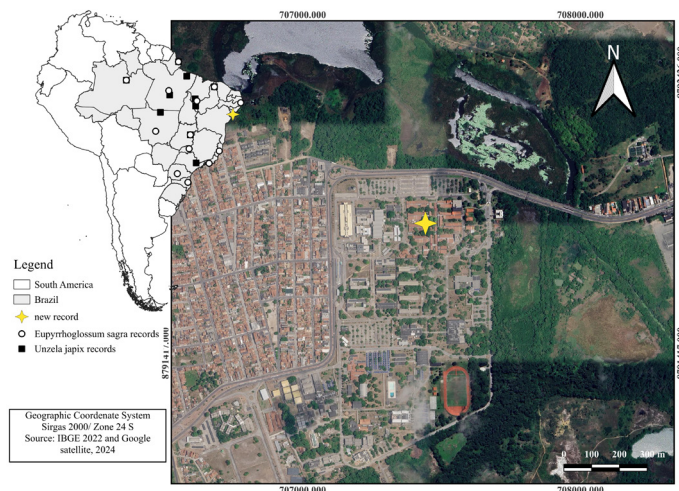


Figure 1. Map showing historical records and collection sites for this study. The white circle indicates the occurrence of *Eupyrrhoglossum sagra* Poey, 1832 (Lepidoptera: Sphingidae) in Brazil, and the black square indicates the occurrence of *Unzela japix* (Cramer, 1776) (Lepidoptera: Sphingidae) throughout Brazil.

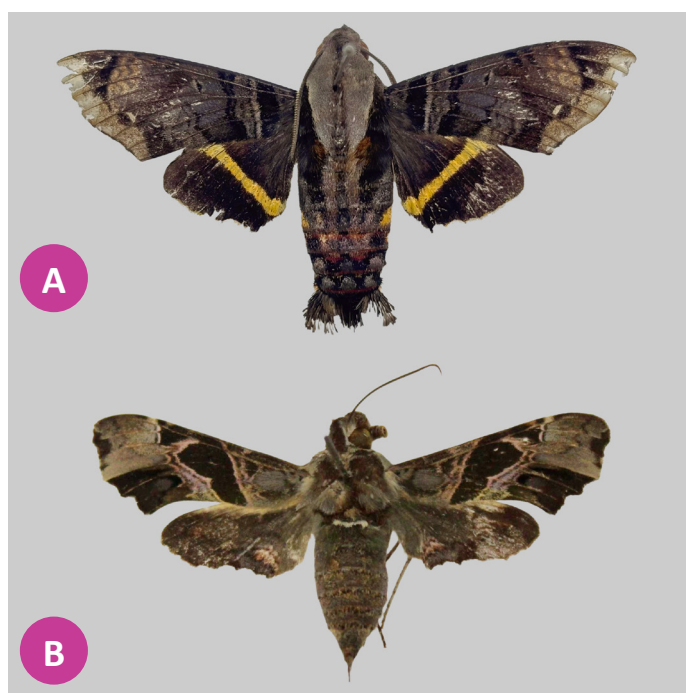


Figure 2. New records of sphingid moths in Sergipe state: (A) *Eupyrrhoglossum sagra* Poey, 1832 (Lepidoptera: Sphingidae); (B) *Unzela japix* (Cramer, 1776) (Lepidoptera: Sphingidae). Specimens were collected at the Federal University of Sergipe, São Cristóvão Campus.

Based on our findings, *E. sagra*, which, according to Haxaire (2019), is potentially distributed across all Brazilian states, had its distribution extended by 388 km to the southwest, with the nearest previous record in the state of Pernambuco (Primo et al. 2013). Prior records of this species include the Northern region (Amazonas, Roraima, and Pará) (Motta et al. 1991; Motta & Andreazze 2001; Haxaire 2019), the Northeast (Maranhão, Piauí, and Pernambuco) (Primo et al. 2013; Câmara et al. 2018; Camargo et al. 2018), the Southeast (Minas Gerais, Espírito Santo, and Rio de Janeiro) (Amorim et al. 2009; Brown & Freitas 2000; Haxaire 2019), the Central West (Distrito Federal and Mato Grosso) (Camargo et al. 2018), and the South (Paraná and Santa Catarina) (Haxaire 2019).

Unzela japix, on the other hand, is considered a rare species (Haxaire 2019), and its distribution extends 1,043 km southeast, with the closest

previous record in the state of Piauí (Câmara et al. 2018). Previous records of this species were from the Northern region (Amazonas, Pará, and Roraima) (Rothschild & Jordan 1910; Motta et al. 1991; Motta & Andreazze 2001; Camargo et al. 2016), the Northeast (Maranhão and Piauí) (Mielke & Haxaire 2013; Câmara et al. 2018), Southeast (São Paulo and Rio de Janeiro) (Martin et al. 2011; Ramos et al. 2021), and the Central-West Brazil (Distrito Federal and Mato Grosso) (Camargo et al. 2018). The distribution patterns of both species were similar, and their actual ranges may be broader than those currently documented.

One of the main factors influencing the distribution of hawkmoths is the availability and distribution of host plants. Sphingids are closely related to their larval host plants, with most species being monophagous or oligophagous during their immature stages, whereas adults serve as pollinators of sphingophilous plants (Bernays & Janzen 1988). *Unzela japix* larvae feed on species from the family Dilleniaceae, particularly *Dolioscarpus dentatus* (Aubl.) Standl., *Curatella americana* L., *Davilla* sp., and *Tetracera* sp. *Dolioscarpus dentatus* and *C. americana* were found at the study site and in various municipalities within the state (Haxaire 2019; CRIA 2025; Moré et al. 2025). *Eupyrrhoglossum sagra* use plant species from the family Rubiaceae, including the native *Genipa americana* L. (genipap) and the exotic *Morinda citrifolia* L. (noni), both of which are abundant at the study site (Gomes et al. 2017; Camargo et al. 2018; Haxaire 2019). Additionally, *Azadirachta indica* A. Juss. (neem), a common and abundant exotic sphingophilous species, was flowering near the location where *U. japix* was collected the day before. While we recognize that this is a speculative hypothesis, it is possible that *U. japix* was attracted to this plant and resting nearby, due to the short corolla tube of its inflorescences.

The species *E. ello*, *E. vitis*, *P. ficus*, and *P. strigilis* are considered common according to previous surveys conducted in Brazil (Darrault & Schlindwein 2002; Primo et al. 2013; Câmara et al. 2018) and are frequently recorded in urban areas (GMV, unpubl. data). Their host plants include *Anacardium occidentale* L. (cashew), *Ficus* spp., *Manihot esculenta* Crantz (cassava), *Carica papaya* L. (papaya), and *Vitis* sp. (grapevine), which are classified as pest species (Camargo et al. 2018). These plants are widely distributed and cultivated in both urban and rural areas. Additionally, they are sphingophilous and are commonly found at the study site as either ornamental or fruit-bearing plants.

Our results provide a small snapshot of the hawkmoth fauna of Sergipe. Although the state is relatively small in territorial extension (21,910 km²), this subsampling represents a significant contribution to filling the Wallacean gap for Sphingidae in the country. The records presented here represent new occurrence localities that can be used to test species distribution hypotheses, particularly for rare species, and can serve as a baseline for future conservation efforts.

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Authors' Contributions

GMV: Conceptualization, Investigation, Data curation, Writing – original draft, Writing—review & editing; SAS: Data curation, Visualization, Writing – review & editing; GKSC: Data curation, Visualization, Writing – review & editing; ABSF: Data curation, Investigation, Visualization, Writing – review & editing; CAL: Investigation, Visualization, Writing – review & editing; and JCS: Conceptualization, Investigation, Funding

acquisition, Resources, Supervision Writing – review & editing. All authors actively participated in results, discussion, reviewed and approved the final version of the manuscript.

Conflicts of Interest Statement

The authors declare that they have no conflict of interest related to the publication of this manuscript.

Ethical Approval

This study did not involve human subjects or clinical trials, which required authorization from an Institutional Committee.

Data Availability

Data publicly available on [10.5281/zenodo.20946136](https://zenodo.org/record/20946136).

Generative AI Statement

The authors used Paperpal software to assist in reviewing the translation of the manuscript. After using this tool, the authors thoroughly revised the content as needed and assumed full responsibility for the content of the publication.

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