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Lepidoptera (Insecta) of medical relevance of the state of Rio de Janeiro, Brazil

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Abstract: Fourteen families of Lepidoptera are considered of medical relevance, with six of them recorded in Brazil. However, basic information on medically relevant Lepidoptera in Brazil is limited, with most studies focused on the southern region. This study presents the first comprehensive list of Lepidoptera of medical relevance for the state of Rio de Janeiro based on data from literature, *iNaturalist*, and the Taxonomic Catalog of the Brazilian Fauna. Based exclusively on literature, 161 species of Lepidoptera of medical relevance have been recorded in southern and southeastern Brazil, with 90 species found in Rio de Janeiro. By incorporating additional sources, the list expands to 325 species, 268 of which are found in Rio de Janeiro. These are distributed across Saturniidae (20 genera / 98 species), Lasiocampidae (6 / 98), Megalopygidae (5 / 38), Limacodidae (8 / 25), Erebidae (1 / 8), and Aididae (1 / 1). The study also discusses records from the Notifiable Diseases Information System, clinical terminologies related to Lepidoptera, and the importance of citizen science platforms in expanding scientific knowledge. Additionally, the taxonomic challenges in identifying these insects are highlighted.

Key words: Atlantic Forest, erucism, lepidopterism, public health, venomous animal.

INTRODUCTION

Lepidoptera is one of the megadiverse orders of insects with approximately 160,000 species in the world distributed in 133 families from which 13,127 species and 63 families are recorded in Brazil (van Nieukerken et al. 2011, Freitas 2012, Mitter et al. 2017, Carneiro et al. 2024). Fourteen families of Lepidoptera are considered of medical relevance due the presence of toxins (venom) at one or more developmental stages, which can cause accidents upon contact with humans, as follows: Limacodidae, Megalopygidae, Aididae, Zygaenidae, Erebidae, Nolidae, Noctuidae, Notodontidae, Lasiocampidae, Saturniidae, Nymphalidae, Somabrachyidae, Eupterotidae, and Anthelidae (Battisti et al. 2024). All but the three latter families have representatives in Brazil although the records in the country of accidents in humans are restricted to Limacodidae, Megalopygidae, Aididae, Saturniidae, Erebidae, and Lasiocampidae (Specht et al. 2008). Although some studies add Zygaenidae and Nymphalidae in this list (i.e. Specht et al. 2008, Villas-Boas et al. 2016) all the known records to those families came from non-Brazilian species, and those are restricted to North and Central America, Asia and Australia (see Battisti et al. 2024, Table III and references cited there).

Although butterflies and moths are considered the most charismatic insects, several species may cause skin (dermatitis) or systematic reactions in humans in all of their developmental stages (Cardoso et al. 2003, Specht et al. 2008). Most of the lepidopteran with potential to cause these accidents only do that on its larval stage (*erucism*), also commonly called in Brazil as *taturanas*, *mandorovás*,

mandruvás or *lagarta de fogo* (Fonseca 1949). In this stage, the larvae may have distinct body ornamentations that play the role of a toxin inoculating device. These ornamentations received specific terminologies, such as verruca and scolus (Specht 2008) that can vary in accordance with the family and/or species. For instance, verrucae are found in several species of Erebidae and Megalopygidae being characterized by raised sclerites in the larval tegument with radiating spine-like setae with a venom gland at their base that cause irritation in humans through mechanical contact. In some species of *Megalopyge* (Megalopygidae), whose larvae are known as puss caterpillars (referred to in Portuguese as *lagarta cachorrinho* or *lagarta gatinho*), the venom glands are confined to the concealed, shorter spine-like setae. The larger setae that lend the species its common name do not contain venom glands. In turn, scoli are commonly found in Saturniidae species, and comprises a central axis and lateral projections containing toxin-secreting glands at the apex of each one (Ministério da Saúde 2024).

Information on the accidents caused by contact with pupae and or/cocoons are even more scarce. Specht (2004a) reported cases of small edemas with punctiform lesions caused by laboratory rearing activities of *Tolype ventriosa* (Draudt, 1927) (Lasiocampidae). By weaving cocoons, *T. ventriosa* larvae mixed the urticant setae with silk. Tripi et al. (2010) reported a rare case of cocoon ingestion of *Lophocampa caryae* Harris, 1841 (Erebidae) by a 14-month-old child that caused severe symptoms of irritation, salivation, anorexia, among others. This species does not occur in Brazil but it is considered of medical relevance (Kuspis et al. 2001). Villas-Boas et al. (2016) also points out that some lepidopteran species of medical relevance transfer their larval setae to cocoons, which can make it a greater source of irritation due its concentration of embedded setae. In Brazil, *Hylesia* Hübner, [1820] (Saturniidae) is the only known genus to have species that cause accidents in humans in the adult stage (*lepidopterism*). However, modified scales on the wings and abdomen with urticant properties are only present in females, which in turn use them to cover their eggs, creating an efficient defense mechanism for them (Brito et al. 2015, Villas-Boas et al. 2016). According to *Manual de Diagnóstico e Tratamento de Animais Peçonhentos* (Ministério da Saúde 2001) the main accidents caused by lepidopterans in Brazil are: (1) Urticating dermatitis, caused by the contact with larvae of several species and female adults of *Hylesia*; (2) Phalangeal periarthritis, due to contact with the larvae of *Premolis semirufa* (Erebidae) also locally known as *pararama*; (3) Hemorrhagic syndrome, caused by the contact with species of *Lonomia* Walker [1855] (Saturniidae), being considered the most dangerous type of accident that can lead to the failure of multiple organs and systems. In moderate and severe cases of accidents with *Lonomia* species, the antilonomic serum (SALon) is prescribed, which is registered and manufactured by the Instituto Butantan in São Paulo, Brazil (Instituto Butantan 2021).

Basic information on Lepidoptera of medical relevance is still limited in Brazil, mainly considering its broad territorial dimension, as well as its faunal, vegetational, orographic, and climatic heterogeneity. Most of the studies on this topic, including lists of species, comprise the Lepidoptera fauna from south Brazil, mainly from the state of Rio Grande do Sul (Specht et al. 2004b, 2005a, b, 2006a). Accidents reports and erucism epidemiological profile are found to the state of Minas Gerais (Franco et al. 2020, Silva et al. 2011), as well as records of lepidopterism outbreaks for the states of São Paulo and Rio Grande do Sul (Glasser et al. 1993, Silveira et al. 2023). To the state of Rio de Janeiro there is only

a study (Corrêa et al. 2004) reporting a putative case of accident caused by an undetermined species of *Lonomia*. Therefore, the present study aims to provide the first comprehensive list of Lepidoptera of medical relevance for the state of Rio de Janeiro.

MATERIALS AND METHODS

The list of Lepidoptera of medical relevance for the state of Rio de Janeiro was produced based on data from literature, *iNaturalist* citizen science platform, and Taxonomic Catalog of the Brazilian Fauna (TCBF).

For the literature review, searches were carried out for papers with emphasis in the Lepidoptera of the south and southeastern Brazil, on the Google Scholar, Capes Periodicals Portal, and ResearchGate platforms using the following keywords (individuals and combined with "Rio de Janeiro"): *erucism*, *lepidopterism, lepidoptera of medical relevance, lepidopteran, public health*. For each one of the accessed platforms up to page 10 was verified. The search parameters used at Google Scholar which presented a more effective result from the keywords were (1) Period: any time; (2) Sort: by relevance; (3) Language: in any language; (4) Any type of article including citations.

The only publications on inventories of Lepidoptera of medical relevance found in the abovementioned filters were six papers covering the state of Rio Grande do Sul (Specht et al. 2004b, 2005a, b, 2006a, Siewert & Silva 2012, Lutinski et al. 2016). It was also considered publications on the Brazilian venomous animals (Fonseca 1949, Cardoso et al. 2003) that includes Lepidoptera of medical relevance that are not listed in the inventories of Rio Grande do Sul but have occurrence records for the state of Rio de Janeiro. Additionally, papers on the biology of the species of medical relevance (Drechsel 2014, Citeli et al. 2021) not cited in the previously mentioned works were also included but only with a confirmed record of the species for the state of Rio de Janeiro.

As there are no inventories of Lepidoptera of medical relevance for the state of Rio de Janeiro it was first elaborated a preliminary list based on the above cited papers (referred herein as *core literature*), and then checked the occurrence of the taxa in the state. So far, the only inventories and available lists for the families of Lepidoptera of medical relevance in the state of Rio de Janeiro are Nascimento et al. (2016) for Erebidae (Arctiinae), Miranda et al. (2015) e Souza-Silva et al. (unpublished data) for Saturniidae, and Zikán & Zikán (1968) that comprises several families of Lepidoptera including the two previously cited plus Lasiocampidae, Limacodidae, and Megalopygidae.

Additionally, the occurrence records to the state of Rio de Janeiro were also confirmed at the TCBF, and the *iNaturalist* citizen science platform. Searches for taxa at *iNaturalist* and TCBF were performed between October 2022 and January 2024. For Lepidoptera taxa found at *iNaturalist* only the occurrences in the "Research Level" category were used meaning that the record has media (usually photos), location, date and community consensus on the identification (generally at the species level). Occurrences in the Research Level up to January 2024 were considered. When more than one record of a given species was made on the same day and approximate time by a citizen scientist, only a single record was considered. This standard was adopted to minimize the interference of this indicator in the interpretation of the results related to seasonality and taxa distribution in the municipalities. The taxonomic identifications suggested on *iNaturalist* were subsequently verified using specialized references, including available taxonomic revisions for genera, species

descriptions, and comparisons with identified specimens deposited at the new Entomological Collection of the Museu Nacional, Universidade Federal do Rio de Janeiro (MNRJ).

From the list of Lepidoptera of medical relevance to the state of Rio de Janeiro with confirmed records in literature, a general list was elaborated also including species by inference. It means species that have potential to offer risks of accidents in humans considering that other species of the same genus are confirmed to be of medical relevance in the literature, an approach also used in Specht (2008) and Battisti et al. (2024). The inference list followed the same search parameters by using the inventories and platforms cited, and we highlighted these taxa in Table 1 to underscore the need for future studies to confirm their status as medically relevant. *Lophocampa* (Erebidae) was the only genus not cited in the core literature that was included in our study based on inference. Larvae of *Lophocampa caryae* Harris, 1841 are stinging (Kuspis et al. 2001) and, although this species is not recorded in Brazil there are 17 other species of *Lophocampa* reported to the country (Specht et al. 2024) from which eight occurs in the state of Rio de Janeiro (Nascimento et al. 2016), all with the potential to cause accidents in humans.

Table I. List of Lepidoptera of medical relevance recorded in southeastern and south Brazil based on literature, iNaturalist, and Taxonomic Catalog of the Brazilian Fauna. Species found in the state of Rio de Janeiro are indicated. *inferred species; ● exclusive data from *iNaturalist*. Refs = References: 1) Fonseca (1949); 2) Zikán & Zikán (1968); 3) Cardoso et al. (2003); 4) Specht et al. (2004); 5) Specht et al. (2005a); 6) Specht et al. (2005b); 7) Specht et al. (2006a); 8) Specht et al. (2008); 9) Siewert & Silva (2012); 10) Drechsel (2014); 11) Miranda (2015); 12) Nascimento et al. (2016); 13) Lutinski et al. (2016); 14) Citeli (2021); 15) Souza-Silva et al. (unpublished data); 16) Becker (2022).

Taxa					Refs	RJ
Aididae	-	***Brachycodilla***		Dyar, 1898		
Aididae	-	*Brachycodilla*	*carmen*	(Schaus, 1892)	5; 9	X
Aididae	-	*Brachycodilla*	*osorius*	(Herrich Schäffer, 1856)	5	
Erebidae	Arctiinae	***Lophocampa***		Harris, 1841		
Erebidae	Arctiinae	*Lophocampa*	*annulosa**	(Walker, 1855)	12	X
Erebidae	Arctiinae	*Lophocampa*	*atrimaculata**	(Hampson, 1901)	12	X
Erebidae	Arctiinae	*Lophocampa*	*catenulata**	(Hübner, [1812])	12	X
Erebidae	Arctiinae	*Lophocampa*	*citrina**	(Sepp, [1843])	12	X
Erebidae	Arctiinae	*Lophocampa*	*modesta**	Kirby, 1892	12	X
Erebidae	Arctiinae	*Lophocampa*	*romoloa**	(Schaus, 1933)	12	X
Erebidae	Arctiinae	*Lophocampa*	*ronda**	(Jones, 1908)	12	X
Erebidae	Arctiinae	*Lophocampa*	*texta**	(Herrich-Schäffer, 1855)	12	X
Erebidae	Arctiinae	***Premolis***		Hampson, 1901		
Erebidae	Arctiinae	*Premolis*	*semirufa*	(Walker, 1856)	8	
Lasiocampidae	Poecilocampinae	***Artace***		Walker, 1855		
Lasiocampidae	Poecilocampinae	*Artace*	*aemula*	Draudt, 1927	7	
Lasiocampidae	Poecilocampinae	*Artace*	*anetje**	Schaus, 1934	2	X
Lasiocampidae	Poecilocampinae	*Artace*	*anula**	Schaus, 1892	2	X

Table I. Continuation.

Lasiocampidae	Poecilocampinae	*Artace*	*argentina*	Schaus, 1924	9	
Lasiocampidae	Poecilocampinae	*Artace*	*connecta**	Draudt, 1927	2	X
Lasiocampidae	Poecilocampinae	*Artace*	*cribaria*	(Ljungh, 1825)	2; 7; 8; 9	X
Lasiocampidae	Poecilocampinae	*Artace*	*helier*	Schaus, 1924	7	
Lasiocampidae	Poecilocampinae	*Artace*	*itatyaia**	Schaus, 1934	2	X
Lasiocampidae	Poecilocampinae	*Artace*	*menuve*	Schaus 1924	2; 7; 9	X
Lasiocampidae	Poecilocampinae	*Artace*	*meridionalis**	Schaus, 1892		X
Lasiocampidae	Poecilocampinae	*Artace*	*neeltje**	Schaus, 1934	2	X
Lasiocampidae	Poecilocampinae	*Artace*	*regalis*	Jones, 1921	7	
Lasiocampidae	Poecilocampinae	*Artace*	*rosea**	Draudt, 1927		X
Lasiocampidae	Poecilocampinae	*Artace*	*rubripalpis*	(C. Felder, 1874)	7; 9	
Lasiocampidae	Poecilocampinae	*Artace*	*sisoes*	Schaus, 1924	7	
Lasiocampidae	Poecilocampinae	***Euglyphis***		Hübner, 1820		
Lasiocampidae	Poecilocampinae	*Euglyphis*	*abolla**	Draudt, 1927	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*adusta**	(Walker, 1855)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*albidifascia**●	(Walker 1855)		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*albidula**●	(Dognin, 1916)		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*amathuria**	(Druce, 1890)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*argyphea**	(Berg, 1883)		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*braganza**	(Schaus, 1892)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*braganzina**	Schaus, 1934		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*brunnea*	(Schaus, 1936)	7	
Lasiocampidae	Poecilocampinae	*Euglyphis*	*campinata**	Schaus, 1934	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*castrensis*	(Schaus, 1894)	7	
Lasiocampidae	Poecilocampinae	*Euglyphis*	*claudia*	(Stoll, 1782)	7	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*deusta*	(Herrich-Schäffer, 1854)	7; 9	
Lasiocampidae	Poecilocampinae	*Euglyphis*	*dicax**	Draudt, 1927	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*divulsa**●	Draudt, 1927		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*efferata*	Draudt, 1927	7	
Lasiocampidae	Poecilocampinae	*Euglyphis*	*falsa**	(Schaus, 1894)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*fibra*	(Schaus, 1890)	2; 7; 8; 9; 13	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*folia**	(Schaus, 1906)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*genesa**	(Schaus, 1906)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*giulia**●	(Schaus, 1906)		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*guttivena*	(Walker, 1855)	2; 7	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*guttularis*	(Walker, 1855)	2; 7; 9	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*incivilis**	(Walker, 1865)		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*kotzschi*	Draudt, 1927	2; 9	X

Table I. Continuation.

Lasiocampidae	Poecilocampinae	*Euglyphis*	*lacrimosa*	(Schaus, 1892)	2; 7; 9	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*lascoria cariacica*	(Draudt, 1927)	7	
Lasiocampidae	Poecilocampinae	*Euglyphis*	*larunda**	(Druce, 1887)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*lignosa*	(Walker, 1855)	7; 8	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*lillia**	Schaus, 1936		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*maha**	Schaus, 1924		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*maria**	(Schaus, 1910)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*marna*	(Schaus, 1896)	2; 7	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*mediana**	Schaus, 1896		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*melancholica*●	(Butler, 1878)	7	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*modesta**●	(Druce, 1887)		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*moeschleri**●	Heppner, 1996		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*mulieraria**	Schaus, 1936	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*narceta*	(Schaus, 1905)	7	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*nigropunctata*	(Schaus, 1905)	2; 7	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*oslacia**	Schaus, 1936	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*ozora**	(Druce, 1899)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*parepa**	(Schaus, 1905)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*petrovna**	(Schaus, 1905)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*pira**●	(Druce, 1899)		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*plana*	(Walker, 1855)	2; 7; 9	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*praedicabilis**	Draudt, 1927	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*primola**	Schaus, 1927	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*punctata**	(Walker, 1855)		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*pygma**	(Schaus, 1900)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*rearensis*	Schaus, 1936	2; 7	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*salebrosa*	Draudt, 1927	7	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*semifunebris*	(Schaus, 1915)	2; 7; 9	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*sommeri**	Draudt, 1927	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*sordida**	(Schaus, 1892)		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*submarginalis*	(Walker, 1866)	2; 7; 9	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*sulga*	(Schaus, 1905)	7	
Lasiocampidae	Poecilocampinae	*Euglyphis*	*sura**	(Schaus, 1905)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*tamila**	(Schaus, 1906)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*tamira**	Schaus, 1936		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*temperata**	Draudt, 1927		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*terranea*	(Butler, 1878)	7	
Lasiocampidae	Poecilocampinae	*Euglyphis*	*theresa**	(Schaus, 1892)		X

Table I. Continuation.

Lasiocampidae	Poecilocampinae	*Euglyphis*	*torrida**	(Schaus, 1910)	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*tosticrista**	Draudt, 1927		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*varma**●	(Schaus, 1905)		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*vitripuncta**●	(Schaus, 1896)		X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*viridisuffusa**	Schaus, 1936	2	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*zikani*	Draudt, 1927	2; 7	X
Lasiocampidae	Poecilocampinae	*Euglyphis*	*zurcheri**●	(Druce, 1897)		X
Lasiocampidae	Poecilocampinae	***Mesera***		Walker, 1855		
Lasiocampidae	Poecilocampinae	*Mesera*	*arpia*	Schaus, 1896	7	
Lasiocampidae	Poecilocampinae	***Nesara***		Walker, 1855		
Lasiocampidae	Poecilocampinae	*Nesara*	*subfumata**	(Schaus)	2	X
Lasiocampidae	Poecilocampinae	*Nesara*	*ocruma*	(Schaus, 1905)	7	
Lasiocampidae	Poecilocampinae	***Sphinta***		Schaus, 1904		
Lasiocampidae	Poecilocampinae	*Sphinta*	*cossoides*	Schaus, 1904	2; 7	X
Lasiocampidae	Poecilocampinae	***Titya***		Walker, 1855		
Lasiocampidae	Poecilocampinae	*Titya*	*alma*	Weymer, 1895	7; 9	
Lasiocampidae	Poecilocampinae	*Titya*	*avita*	Schaus, 1924	7	
Lasiocampidae	Poecilocampinae	*Titya*	*arpiana**	Schaus, 1924	2	X
Lasiocampidae	Poecilocampinae	*Titya*	*cain**	Schaus, 1936	2	X
Lasiocampidae	Poecilocampinae	*Titya*	*cinerascens**●	(Walker, 1856)		X
Lasiocampidae	Poecilocampinae	*Titya*	*fraternans**	Schaus, 1936	2	X
Lasiocampidae	Poecilocampinae	*Titya*	*fumida**	(Schaus, 1892)		X
Lasiocampidae	Poecilocampinae	*Titya*	*hirtipes*	Walker, 1855	7	
Lasiocampidae	Poecilocampinae	*Titya*	*intercalaris**	Draudt, 1927	2	X
Lasiocampidae	Poecilocampinae	*Titya*	*noctilux**	Walker, 1855		X
Lasiocampidae	Poecilocampinae	*Titya*	*proxima*	(Burmeister, 1878)	2; 7; 8	X
Lasiocampidae	Poecilocampinae	*Titya*	*rivulosa**	(Butler, 1878)	2	X
Lasiocampidae	Poecilocampinae	*Titya*	*trilinea*	(Dognin, 1901)	9	
Lasiocampidae	Poecilocampinae	***Tolype***		Hübner, 1820		
Lasiocampidae	Poecilocampinae	*Tolype*	*albiapicata*	(Schaus, 1915)	2; 7	X
Lasiocampidae	Poecilocampinae	*Tolype*	*alegra*	Dognin, 1922	7	
Lasiocampidae	Poecilocampinae	*Tolype*	*biapicata**	(Bryk, 1953)	2	X
Lasiocampidae	Poecilocampinae	*Tolype*	*castralia**	(Jones, 1912)	2	X
Lasiocampidae	Poecilocampinae	*Tolype*	*catharina*	Draudt, 1927	7	
Lasiocampidae	Poecilocampinae	*Tolype*	*cinella**	Schaus, 1905	2	X
Lasiocampidae	Poecilocampinae	*Tolype*	*cupriflua*	Draudt, 1927	7	
Lasiocampidae	Poecilocampinae	*Tolype*	*disciplaga**	Draudt, 1927	2	X
Lasiocampidae	Poecilocampinae	*Tolype*	*frenata**	(Schaus, 1936)	2	X

Table I. Continuation.

Lasiocampidae	Poecilocampinae	*Tolype*	*fuscicaudata*	(Schaus, 1905)	2; 7	X
Lasiocampidae	Poecilocampinae	*Tolype*	*gondoval**	Schaus, 1934	2	X
Lasiocampidae	Poecilocampinae	*Tolype*	*indecisa*	(Walker, 1855)	7; 9	
Lasiocampidae	Poecilocampinae	*Tolype*	*innocens*	(Burmeister, 1878)	7	
Lasiocampidae	Poecilocampinae	*Tolype*	*medialis*●	(Jones, 1912)	7; 9	X
Lasiocampidae	Poecilocampinae	*Tolype*	*pellita*	Draudt, 1927	7; 9	
Lasiocampidae	Poecilocampinae	*Tolype*	*pelochroa**	Berg, 1883		X
Lasiocampidae	Poecilocampinae	*Tolype*	*primitiva**	(Walker, 1855)		X
Lasiocampidae	Poecilocampinae	*Tolype*	*picta*	(C. Felder, 1874)	7	
Lasiocampidae	Poecilocampinae	*Tolype*	*poggia*	Schaus, 1905	7	
Lasiocampidae	Poecilocampinae	*Tolype*	*quiescens**	Schaus, 1936		X
Lasiocampidae	Poecilocampinae	*Tolype*	*rinchois**	Schaus, 1934	2	X
Lasiocampidae	Poecilocampinae	*Tolype*	*scaenica*	Draudt, 1927	7	
Lasiocampidae	Poecilocampinae	*Tolype*	*serralta**	(Jones, 1912)	2	X
Lasiocampidae	Poecilocampinae	*Tolype*	*undulosa*	(Walker, 1855)	2; 7; 8	X
Lasiocampidae	Poecilocampinae	*Tolype*	*ventriosa*	Draudt, 1927	7; 8	
Lasiocampidae	Poecilocampinae	*Tolype*	*vespertilio*	Draudt, 1927	7	
Lasiocampidae	Poecilocampinae	***Tytocha***		Schaus, 1924		
Lasiocampidae	Poecilocampinae	*Tytocha*	*crassilinea*	(Dognin, 1923)	7	
Limacodidae	Limacodinae	***Acharia***		Hübner, 1819		
Limacodidae	Limacodinae	*Acharia*	*bonaerensis*	(Berg, 1878)	5	
Limacodidae	Limacodinae	*Acharia*	*eucleides**●	(Dyar, 1905)		X
Limacodidae	Limacodinae	*Acharia*	*nesea*●	(Stoll, 1780)	5; 8	X
Limacodidae	Limacodinae	*Acharia*	*norans*	(Dyar, 1927)	5; 9	
Limacodidae	Limacodinae	*Acharia*	*trimacula*	(Sepp, [1842])	5; 8	
Limacodidae	Limacodinae	***Miresa***		Walker, 1855		
Limacodidae	Limacodinae	*Miresa*	*clarissa*	(Stoll, [1790])	2; 5; 9	X
Limacodidae	Limacodinae	***Natada***		Walker, 1855		
Limacodidae	Limacodinae	*Natada*	*arpi**	Dyar, 1908	2	X
Limacodidae	Limacodinae	*Natada*	*lucens**●	(Walker, 1855)		X
Limacodidae	Limacodinae	*Natada*	*perpectinata**	(Dyar 1906)	2	X
Limacodidae	Limacodinae	*Natada*	*pucara*	(Dognin, 1893)	2; 5	X
Limacodidae	Limacodinae	*Natada*	*subpectinata**●	Dyar, 1905		X
Limacodidae	Limacodinae	***Parasa***		Moore, 1859		
Limacodidae	Limacodinae	*Parasa*	*cucumenica**	Dyar, 1926		X
Limacodidae	Limacodinae	*Parasa*	*herbina**	(Schaus, 1901)	2	X
Limacodidae	Limacodinae	*Parasa*	*mionexia*	Dyar, 1924	5; 9	
Limacodidae	Limacodinae	*Parasa*	*schausi*	Dyar, 1905	5	

Table I. Continuation.

Limacodidae	Limacodinae	*Parasa*	*viridiplena*	(Walker, 1855)	2; 5	X
Limacodidae	Limacodinae	***Perola***		Walker, 1855		
Limacodidae	Limacodinae	*Perola*	*brumalis*	(Schaus, 1894)	2; 5	X
Limacodidae	Limacodinae	*Perola*	*chica*	(Jones, 1912)	2; 5	X
Limacodidae	Limacodinae	*Perola*	*cicur**●	(Schaus, 1892)		X
Limacodidae	Limacodinae	*Perola*	*danetta*	Dyar, 1926	5	
Limacodidae	Limacodinae	*Perola*	*jorgenseni*	Schaus, 1921	5	
Limacodidae	Limacodinae	*Perola*	*murina**●	Walker, 1855		X
Limacodidae	Limacodinae	*Perola*	*petropolis*	Dyar, 1905	5; 9	X
Limacodidae	Limacodinae	*Perola*	*repetita**	Druce, 1900	2	X
Limacodidae	Limacodinae	*Perola*	*subpunctata*	(Walker, 1855)	2; 5; 9	X
Limacodidae	Limacodinae	*Perola*	*sucia**	Schaus, 1896	2	X
Limacodidae	Limacodinae	*Perola*	*umber**	Dyar, 1906	2	X
Limacodidae	Limacodinae	*Perola*	*villosipes**●	(Walker, 1865)		X
Limacodidae	Limacodinae	Phobetron		Hübner, 1825		
Limacodidae	Limacodinae	*Phobetron*	*hipparchia*	(Cramer, [1777])	2; 5; 8	X
Limacodidae	Limacodinae	***Semyra***		Walker, 1855		
Limacodidae	Limacodinae	*Semyra*	*bella**	(Herrich-Schäffer, [1854])	2	X
Limacodidae	Limacodinae	*Semyra*	*coarctata*	Walker, 1855	5	
Limacodidae	Limacodinae	*Semyra*	*frances*	Dyar, 1921	5	
Limacodidae	Limacodinae	*Semyra*	*incisa*	(Walker, 1855)	5; 2	X
Limacodidae	Limacodinae	*Semyra*	*lucilla*	Dyar, 1927	5	
Limacodidae	Limacodinae	***Talima***		Walker, 1855		
Limacodidae	Limacodinae	*Talima*	*ingenour*	Dyar, 1926	5	
Limacodidae	Limacodinae	*Talima*	*postica**●	Walker, 1855		X
Limacodidae	Limacodinae	*Talima*	*rufoflava*	(Walker, 1855)	5; 9	
Megalopygidae	Megalopyginae	***Megalopyge***		Hübner, 1820		
Megalopygidae	Megalopyginae	*Megalopyge*	*albicollis*	(Walker, 1855)	2; 3; 8; 13	X
Megalopygidae	Megalopyginae	*Megalopyge*	*amita*	Schaus, 1900	2; 9	X
Megalopygidae	Megalopyginae	*Megalopyge*	*basalis**	(Walker, 1856)	2	X
Megalopygidae	Megalopyginae	*Megalopyge*	*braulio**●	Schaus, 1924		X
Megalopygidae	Megalopyginae	*Megalopyge*	*lanata*	(Cramer, [1780])	1; 2; 3; 8	X
Megalopygidae	Megalopyginae	*Megalopyge*	*megalopygae**●	(Schaus, 1905)		X
Megalopygidae	Megalopyginae	*Megalopyge*	*nuda**●	(Stoll, [1782])		X
Megalopygidae	Megalopyginae	*Megalopyge*	*radiata*	Schaus, 1892	1; 2; 8	X
Megalopygidae	Megalopyginae	*Megalopyge*	*tharops**●	(Stoll, [1782])		X
Megalopygidae	Megalopyginae	*Megalopyge*	*undulata vulpina*	(Berg, 1882)	2; 8	X
Megalopygidae	Megalopyginae	*Megalopyge*	*urens*	Berg, 1882	13; 1; 3; 8	

Table I. Continuation.

Megalopygidae	Megalopyginae	*Megalopyge*	*uruguayensis*	Berg, 1882	3; 8	
Megalopygidae	Megalopyginae	***Podalia***		Walker, 1856		
Megalopygidae	Megalopyginae	*Podalia*	*albescens*	(Schaus, 1900)	2; 9	X
Megalopygidae	Megalopyginae	*Podalia*	*dimidiata*	(Herrich-Schäffer, 1856)	9; 2	X
Megalopygidae	Megalopyginae	*Podalia*	*fuscescens**	Walker, 1856	2	X
Megalopygidae	Megalopyginae	*Podalia*	*intermaculata**	(Dognin, 1916))	2	X
Megalopygidae	Megalopyginae	*Podalia*	*mallas*	(Druce, 1899)	2; 4	X
Megalopygidae	Megalopyginae	*Podalia*	*nivosa**	(Jones, 1912)	2	X
Megalopygidae	Megalopyginae	*Podalia*	*orsilochus*	(Cramer, 1775)	2; 3	X
Megalopygidae	Megalopyginae	*Podalia*	*thanatos**●	Schaus, 1905		X
Megalopygidae	Megalopyginae	*Podalia*	*walkerensis**	(Hopp, 1935)	2	X
Megalopygidae	Megalopyginae	*Podalia*	*walkeri*●	(Berg, 1882)	4; 8; 9	X
Megalopygidae	Trosiinae	***Endobrachys***		C. Felder & R. Felder, 1874		
Megalopygidae	Trosiinae	*Endobrachys*	*placida*	(Jones, 1912)	2	X
Megalopygidae	Trosiinae	*Endobrachys*	*revocans*	C. Felder & R. Felder, 1874	16	X
Megalopygidae	Trosiinae	***Mesoscia***		Hübner, 1920		
Megalopygidae	Trosiinae	*Mesoscia*	*itatiayae**	Hopp, 1927	2	X
Megalopygidae	Trosiinae	*Mesoscia*	*pascora*●	Schaus, 1900	4	X
Megalopygidae	Trosiinae	***Norape***		Walker, 1855		
Megalopygidae	Trosiinae	*Norape*	*albilineata*	(Hopp, 1927)	2; 9	X
Megalopygidae	Trosiinae	*Norape*	*argyrorrhoea**	(Hübner, [1823])	2	X
Megalopygidae	Trosiinae	*Norape*	*beggoides*	(Dyar, 1910)	2; 9	X
Megalopygidae	Trosiinae	*Norape*	*cingulata**	(Jones, 1921)	2	X
Megalopygidae	Trosiinae	*Norape*	*nigrovenosa**	(Druce, 1906)	2	X
Megalopygidae	Trosiinae	*Norape*	*puella**	Walker, 1855	2	X
Megalopygidae	Trosiinae	*Norape*	*undulata**●	Jones, 1912		X
Megalopygidae	Trosiinae	*Norape*	*vesta**	(Schaus, 1892)	2	X
Megalopygidae	Trosiinae	*Norape*	*zikaniana**	Hopp, 1927	2	X
Megalopygidae	Trosiinae	***Trosia***		Hübner, [1820]		
Megalopygidae	Trosiinae	*Trosia*	*dimas*	(Cramer, [1775])	2; 9	X
Megalopygidae	Trosiinae	*Trosia*	*fallax**	(Felder, 1874)	2	X
Megalopygidae	Trosiinae	*Trosia*	*misda**	Dyar, 1910	2	X
Megalopygidae	Trosiinae	*Trosia*	*semirufa**	(Druce, 1906)	2	X
Megalopygidae	Trosiinae	*Trosia*	*fumosa**●	Hopp, 1934		X
Saturniidae	*Hemileucinae*	***Austrolippa***		Brechlin & Meister, 2011		
Saturniidae	*Hemileucinae*	*Austrolippa*	*convergens**	(Walker, 1855)	15	X
Saturniidae	*Hemileucinae*	*Austrolippa*	*cruenta*●	(Walker, 1855)	6; 8	X
Saturniidae	*Hemileucinae*	***Automerella***		Michener, 1949		

Table I. Continuation.

Saturniidae	*Hemileucinae*	*Automerella*	*aurora*	(Maassen & Weyding, 1855)	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Automerella*	*chrisbrechlinae**	Brechlin & Meister, 2015	11; 15	X
Saturniidae	*Hemileucinae*	*Automerella*	*flexuosa*	(Felder, 1874)	6; 8; 11	X
Saturniidae	*Hemileucinae*	*Automerella*	*rubicunda**	(Schaus, 1892)	11; 15	X
Saturniidae	*Hemileucinae*	***Automeris***		Hübner, [1819]		
Saturniidae	*Hemileucinae*	*Automeris*	*basalis*	Walker, 1855	6; 11; 15	X
Saturniidae	*Hemileucinae*	*Automeris*	*beckeri*	Herrich-Schäffer, 1856	6; 8; 11; 13; 15	X
Saturniidae	*Hemileucinae*	*Automeris*	*bilinea*	Walker, 1855	10; 11	X
Saturniidae	*Hemileucinae*	*Automeris*	*egeus*	Cramer, 1775	11; 14	X
Saturniidae	*Hemileucinae*	*Automeris*	*hamata**	Schaus, 1906	11	X
Saturniidae	*Hemileucinae*	*Automeris*	*illustris*	Walker, 1855	6; 8; 11; 13; 11; 15	X
Saturniidae	*Hemileucinae*	*Automeris*	*inornata*	Walker, 1855	6; 11; 15	X
Saturniidae	*Hemileucinae*	*Automeris*	*janus*	(Cramer, 1775)	6	
Saturniidae	*Hemileucinae*	*Automeris*	*larra*	(Walker, 1855)	6; 11	X
Saturniidae	*Hemileucinae*	*Automeris*	*melanops*	Walker, 1855	3; 6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Automeris*	*muscula*	Vuillot, 1892	6; 11; 15	X
Saturniidae	*Hemileucinae*	*Automeris*	*naranja naranja*	Schaus, 1898	6; 8; 11; 13; 15	X
Saturniidae	*Hemileucinae*	*Automeris*	*nebulosa*	Conte, 1906	6	
Saturniidae	*Hemileucinae*	*Automeris*	*nubila*	Walker, 1855	6	
Saturniidae	*Hemileucinae*	*Automeris*	*ovalina*	Conte, 1906	6; 11; 15	X
Saturniidae	*Hemileucinae*	*Automeris*	*submacula*	Walker, 1855	6	
Saturniidae	*Hemileucinae*	*Automeris*	*tristis*	Boisduval, 1875	6; 15	X
Saturniidae	*Hemileucinae*	***Callodirphia***		Michener, 1949		
Saturniidae	*Hemileucinae*	*Callodirphia*	*arpi*	(Schaus, 1908)	6; 11; 15	X
Saturniidae	*Hemileucinae*	***Catacantha***		Bouvier, 1930		
Saturniidae	*Hemileucinae*	*Catacantha*	*ferruginea**	(Draudt, 1929)	11; 15	X
Saturniidae	*Hemileucinae*	*Catacantha*	*oculata*	(Schaus, 1921)	6; 11; 15	X
Saturniidae	*Hemileucinae*	***Cerodirphia***		Michener, 1949		
Saturniidae	*Hemileucinae*	*Cerodirphia*	*mielkei**	Lemaire, 2002	15	X
Saturniidae	*Hemileucinae*	*Cerodirphia*	*opis*	(Schaus, 1892)	6; 11; 15	X
Saturniidae	*Hemileucinae*	*Cerodirphia*	*rosacordis**	(Walker, 1855)	11; 15	X
Saturniidae	*Hemileucinae*	*Cerodirphia*	*rubripes*●	(Draudt, 1930)	6	X
Saturniidae	*Hemileucinae*	*Cerodirphia*	*vagans*	(Walker, 1855)	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Cerodirphia*	*zikani*	(Schaus 1921)	6; 11; 15	X
Saturniidae	*Hemileucinae*	***Dirphia***		Hübner, [1819]		
Saturniidae	*Hemileucinae*	*Dirphia*	*araucariae*	(Jones, 1908)	6; 8; 13; 15	X
Saturniidae	*Hemileucinae*	*Dirphia*	*avia**	(Stoll, 1780)	11; 15	X

Table I. Continuation.

Saturniidae	*Hemileucinae*	*Dirphia*	*baroma*	(Schaus 1906)	6; 8; 13; 11; 15	X
Saturniidae	*Hemileucinae*	*Dirphia*	*dolosa*	(Bouvier, 1929)	6; 8; 11; 13; 15	X
Saturniidae	*Hemileucinae*	*Dirphia*	*fornax*	(Druce, 1903)	6; 11	X
Saturniidae	*Hemileucinae*	*Dirphia*	*monticola**	(Zerny, 1923)	11; 15	X
Saturniidae	*Hemileucinae*	*Dirphia*	*muscosa*	Schaus 1898	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Dirphia*	*sombrero**	(Le Cerf, 1934)	11; 15	X
Saturniidae	*Hemileucinae*	*Dirphia*	*triangulum**	(Walker, 1855)	15	X
Saturniidae	*Hemileucinae*	***Dirphiopsis***		Bouvier, 1928		
Saturniidae	*Hemileucinae*	*Dirphiopsis*	*ayuruoca**	(Foetterle, 1901)	11; 15	X
Saturniidae	*Hemileucinae*	*Dirphiopsis*	*delta*	(Foetterle, 1901)	6; 11; 15	X
Saturniidae	*Hemileucinae*	*Dirphiopsis*	*epiolina*	(R. Felder & Rogenhofer, 1874)	6; 11; 15	X
Saturniidae	*Hemileucinae*	*Dirphiopsis*	*lombardi**	(Bouvier, 1924)	11; 15	X
Saturniidae	*Hemileucinae*	*Dirphiopsis*	*multicolor*	(Walker, 1855)	3; 6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Dirphiopsis*	*picturata**	(Schaus, 1913)	15	X
Saturniidae	*Hemileucinae*	*Dirphiopsis*	*trisignata*	(R. Felder & Rogenhofer, 1874)	6; 15	X
Saturniidae	*Hemileucinae*	*Dirphiopsis*	*undulinea**	(F. Johnson, 1937)	11; 15	X
Saturniidae	*Hemileucinae*	*Dirphiopsis*	*wanderbilti**	(Pearson, 1958)	11; 15	X
Saturniidae	*Hemileucinae*	***Eubergia***		Bouvier, 1929		
Saturniidae	*Hemileucinae*	*Eubergia*	*caisa*	(Berg, 1883)	6	
Saturniidae	*Hemileucinae*	***Eudyaria***		Grote, 1896		
Saturniidae	*Hemileucinae*	*Eudyaria*	*venata*	(Butler, 1871)	6; 8	
Saturniidae	*Hemileucinae*	*Eudyaria*	*zeta*	(Berg, 1885)	6; 8	
Saturniidae	*Hemileucinae*	***Gamelia***		Hübner, 1819		
Saturniidae	*Hemileucinae*	*Gamelia*	*anableps**	(Felder, 1874)	11	X
Saturniidae	*Hemileucinae*	*Gamelia*	*catharina*	(Draudt, 1929)	6; 11; 15	X
Saturniidae	*Hemileucinae*	*Gamelia*	*remissa**	(Weymer, 1907)	11; 15	X
Saturniidae	*Hemileucinae*	*Gamelia*	*remissoides**●	Lemaire, 1967	11; 15	X
Saturniidae	*Hemileucinae*	***Heliconisa***		Walker, 1855		
Saturniidae	*Hemileucinae*	*Heliconisa*	*pagenstecheri*	(Geyer [1835])	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	***Hidripa***		Draudt, 1929		
Saturniidae	*Hemileucinae*	*Hidripa*	*paranensis**	(Bouvier, 1929)	11; 15	X
Saturniidae	*Hemileucinae*	*Hidripa*	*perdix*	(Maassen & Weyding, 1885)	6; 11; 15	X
Saturniidae	*Hemileucinae*	*Hidripa*	*taglia*	(Schaus, 1896)	6	
Saturniidae	*Hemileucinae*	***Hylesia***		Hübner, [1820]		
Saturniidae	*Hemileucinae*	*Hylesia*	*dellerbai**	C. Mielke, Joerke, Miranda & Costa, 2020	15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*discifex*	(Draudt, 1929)	6; 8	
Saturniidae	*Hemileucinae*	*Hylesia*	*ebalus**	(Cramer, 1775)	11	X

Table I. Continuation.

Saturniidae	*Hemileucinae*	*Hylesia*	*falcifera**	(Hübner, 1825)	11; 15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*maurex**	Draudt, 1929	11; 15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*metapyrrha*	(Walker, 1855)	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*minasia**	Schaus, 1921	15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*munonia**	(Schaus, 1927)	11; 15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*nanus**	(Walker, 1855)	11; 15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*nigricans*	Berg, 1875	3; 6; 8; 13	X
Saturniidae	*Hemileucinae*	*Hylesia*	*oratex*	(Dyar, 1913)	6; 8; 11	X
Saturniidae	*Hemileucinae*	*Hylesia*	*paulex*	(Dognin, 1922)	3; 6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*remex*	Dyar, 1913	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*rufex*●	Draudt, 1929	6; 8	X
Saturniidae	*Hemileucinae*	*Hylesia*	*scortina*	Draudt, 1929	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*subcottica**	Lemaire, 2002	11; 15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*travassosi **	Lemaire, 1988	15	X
Saturniidae	*Hemileucinae*	*Hylesia*	*vindex*	(Dyar, 1913)	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	***Hyperchiria***		Hübner, [1819]		
Saturniidae	*Hemileucinae*	*Hyperchiria*	*incisa*	Walker, 1855	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Hyperchiria*	*plicata**	(Herrich-Schäffer, 1855)	11; 15	X
Saturniidae	*Hemileucinae*	***Ithomisa***		Oberthür, 1881		
Saturniidae	*Hemileucinae*	*Ithomisa*	*catherina*	(Schaus, 1896)	6; 15	X
Saturniidae	*Hemileucinae*	*Ithomisa*	*kinkelini*	Oberthur, 1881	6	
Saturniidae	*Hemileucinae*	*Ithomisa*	*umbrata**	(Oiticica, 1958)	11; 15	X
Saturniidae	*Hemileucinae*	***Leucanella***		Lemaire, 1969		
Saturniidae	*Hemileucinae*	*Leucanella*	*gibbosa**	(Conte, 1906)	15	X
Saturniidae	*Hemileucinae*	*Leucanella*	*heisleri **	(Jones, 1908)	15	X
Saturniidae	*Hemileucinae*	*Leucanella*	*janeira*	(Westwood, [1854])	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Leucanella*	*memusae*	(Walker, 1855)	6; 8; 11; 13; 15	X
Saturniidae	*Hemileucinae*	*Leucanella*	*viridescens*	Walker, 1855	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	***Lonomia***		Walker, 1855		
Saturniidae	*Hemileucinae*	*Lonomia*	*antoniae**	Brechlin & Meister, 2015	15	X
Saturniidae	*Hemileucinae*	*Lonomia*	*leopoldina**	Brechlin & Meister, 2011	15	X
Saturniidae	*Hemileucinae*	*Lonomia*	*obliqua*	Walker, 1855	3; 6; 8; 11; 13; 15	X
Saturniidae	*Hemileucinae*	***Molippa***		Walker, 1855		
Saturniidae	*Hemileucinae*	*Molippa*	*sabina*	Walker, 1855	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Molippa*	*simillina*	(Jones, 1907)	6; 8; 15	X
Saturniidae	*Hemileucinae*	***Periga***		Walker, 1855		
Saturniidae	*Hemileucinae*	*Periga*	*acuta**	Mielke & Meister, 2013		X

Table I. Continuation.

Saturniidae	*Hemileucinae*	*Periga*	*alticola**	Mielke & Meister, 2013	11; 15	X
Saturniidae	*Hemileucinae*	*Periga*	*circumstans*	Walker, 1855	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Periga*	*falcata**	(Walker, 1855)	11; 15	X
Saturniidae	*Hemileucinae*	*Periga*	*insidiosa**	(Lemaire, 1972)	11; 15	X
Saturniidae	*Hemileucinae*	***Pseudautomeris***		Lemaire, 1967		
Saturniidae	*Hemileucinae*	*Pseudautomeris*	*brasiliensis**	(Walker, 1855)	11; 15	X
Saturniidae	*Hemileucinae*	*Pseudautomeris*	*coronis*	(Schaus 1913)	6; 11	X
Saturniidae	*Hemileucinae*	*Pseudautomeris*	*erubescens**●	(Boisduval, 1875)	11; 15	X
Saturniidae	*Hemileucinae*	*Pseudautomeris*	*grammivora*	(Jones, 1908)	6; 8; 11; 15	X
Saturniidae	*Hemileucinae*	*Pseudautomeris*	*huebneri**	(Boisduval, 1875)	11; 15	X
Saturniidae	*Hemileucinae*	*Pseudautomeris*	*luteata**	(Walker, 1865)	11; 15	X
Saturniidae	*Hemileucinae*	*Pseudautomeris*	*ophthalmica**	(Moore, 1883)	15	X
Saturniidae	*Hemileucinae*	*Pseudautomeris*	*subcoronis**	Lemaire, 1967	11; 15	X
Saturniidae	*Hemileucinae*	***Travassosula***		Michener, 1949		
Saturniidae	*Hemileucinae*	*Travassosula*	*subfumata*	(Schaus, 1921)	6; 11; 15	X

RESULTS

Literature review

Searches retrieved a total of 34 papers covering the state of Rio de Janeiro (1 paper) and other states of south and southeastern Brazil (33). Papers to the south and southeastern Brazil consist of inventories (6), ecological (2) and biological (10) aspects, and accidents reports and epidemiological profile (15). Additionally, 30 studies related to the topic were found but they were not included in our analysis because they are not considered formal publications (i.e. dissertations, thesis, conference proceedings).

General list of the Lepidoptera of medical relevance to the south and southeastern Brazil with emphasis in the state of Rio de Janeiro

Based on data exclusively obtained in literature, 161 species of Lepidoptera of medical relevance were recorded to the south and southeastern Brazil from which 90 species are recorded to the state of Rio de Janeiro (Table I, Figure 1). By adding data from *iNaturalist*, TCBF, and the inference records the general list comprises 325 species of Lepidoptera of medical relevance (Table I) from which 268 species are recorded to the state of Rio de Janeiro (Figure 1).

The Lepidoptera family with highest number of species recorded was Saturniidae (20 genera; 98 species) followed by Lasiocampidae (6 gen.; 98 spp.), Megalopygidae (6 gen.; 38 spp.), Limacodidae (8 gen.; 25 spp.), Erebidae (1 gen.; 8 spp.) e Aididae (1 gen.; 1 spp.) (Table I, Figure 2). From the 47 genera of Lepidoptera of medical relevance cited in the core literature (south and southeastern Brazil), the occurrence of 42 were confirmed in the state of Rio de Janeiro from our literature review, as well as the TCBF, and *iNaturalist*.

Contributions of *iNaturalist* to the knowledge of Lepidoptera of medical relevance to the state of Rio de Janeiro

Six families of Lepidoptera of medical relevance occurring in the state of Rio de Janeiro are recorded in *iNaturalist* performing a total of 35 genera and 128 species from which 35 species are exclusively recorded at this platform being

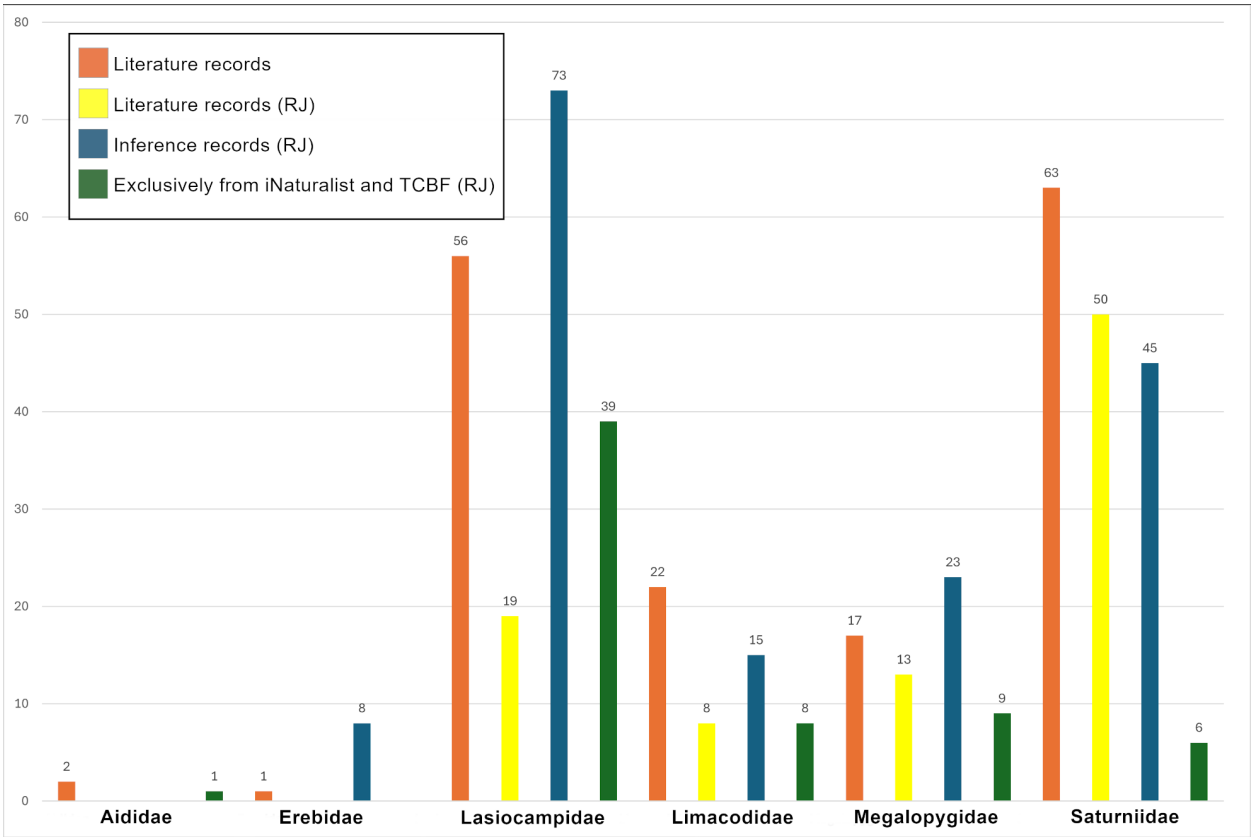

Figure 1. Distribution of the Lepidoptera species of medical relevance, per family and evidence source, recorded from south and southeastern Brazil, and the state of Rio de Janeiro (RJ).

27 of them based on inferences (Figure 1). Most of the records comprises the adult stage (629 records of 129 species), with only 189 records of larvae of 21 species (Figure 3). No records of eggs and pupae were found.

Regarding the distribution of occurrence records of Lepidoptera of medical relevance by municipality (Figure 4), the highest numbers of records were in Rio de Janeiro (125) followed by Cachoeiras de Macacu (108), Itatiaia (81), Nova Iguaçu (74), and Petropólis (67). No occurrences were recorded in 46 municipalities of the state of Rio de Janeiro. Most of the records were made in December and January (Figure 5).

Regarding the richness of Lepidoptera of medical importance by municipality in the state of Rio de Janeiro (Figure 6), the highest numbers of records were in Itatiaia (43) followed by Nova Friburgo (40), Nova Iguaçu (38) and Cachoeiras de Macacu (38). Most of the records were made in December and January (Figure 7).

DISCUSSION

Critical review of the Brazilian *Notifiable Diseases Information System* (SINAN) database on the Lepidoptera of medical relevance

The scarcity of specialized literature on the Brazilian Lepidoptera of medical relevance, particularly in the state of Rio de Janeiro, is remarkable. Overall, there is a lack of detailed knowledge regarding the occurrence of these species in each Brazilian state, as well as accurate data on the number and severity of accidents caused by these Lepidoptera. According to the Brazilian *Notifiable Diseases Information System* database (SINAN) database (Ministério da Saúde 2023), Rio de Janeiro has reported

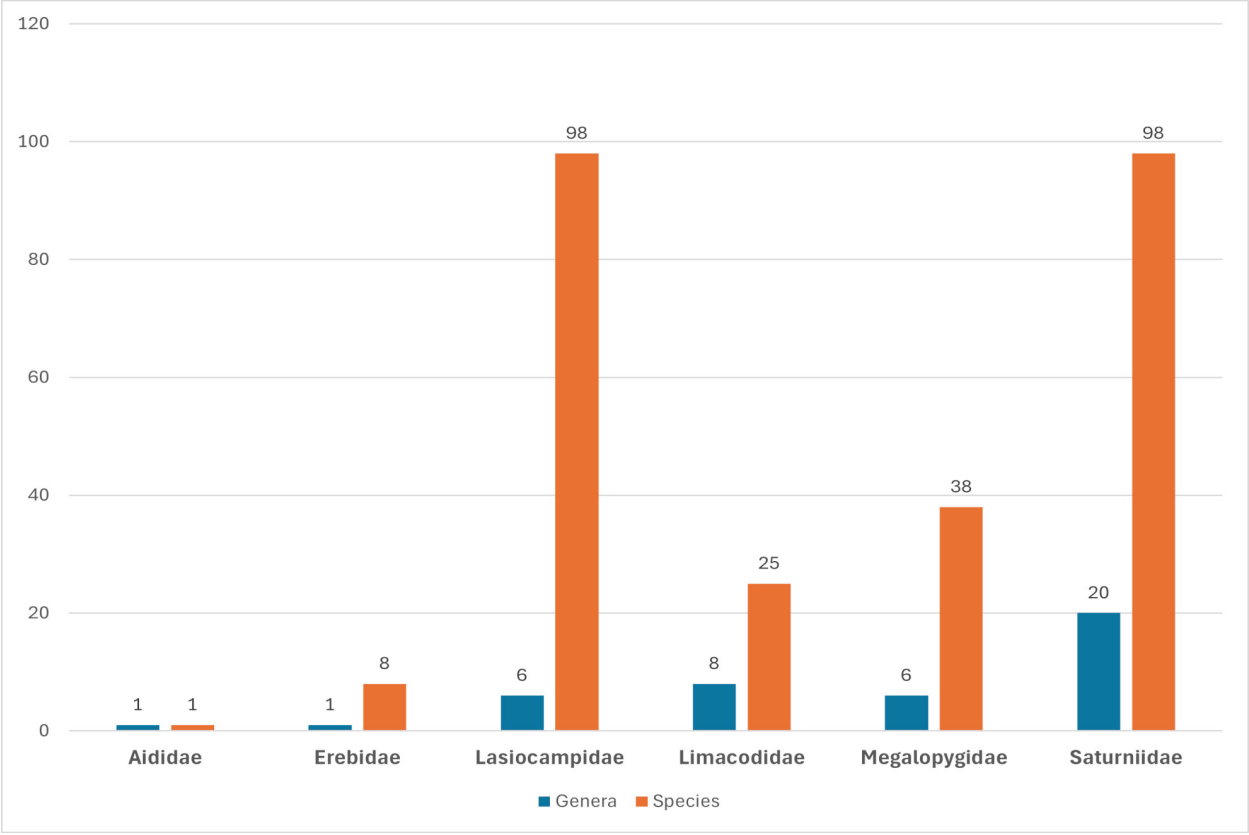

Figure 2. Number of genera and species of Lepidoptera of medical relevance, per family, recorded in the state of Rio de Janeiro based on literature, *iNaturalist*, and Taxonomic Catalogue of the Brazilian Fauna.

the fewest cases of erucism in southeastern Brazil from 2000 to 2022, even fewer than state of Espírito Santo, which has less than a quarter of Rio de Janeiro's population. In comparison, the states of São Paulo and Minas Gerais have accumulated 12,129 and 17,898 records of erucism over 23 years, respectively, while Rio de Janeiro has only 507 records (Ministério da Saúde 2023). The fact that 83% of the Lepidoptera of medical relevance listed to south and southeastern Brazil are found in Rio de Janeiro suggests that cases of erucism and lepidopterism are likely underreported in the state. The limited studies and basic information on the occurrence of these species may contribute to this situation. This issue could be partially addressed by increasing funding for basic research in Biodiversity and Systematics of Lepidoptera, which would help produce updated regional lists of species. Such information would not only enhance our understanding of local lepidopteran biodiversity but also support research in applied fields such as public health and pharmacology. This is exemplified by the reports from the Centro de Informação e Assistência Toxicológica de Santa Catarina - CIATox/SC (Santos et al. 2024), in partnership with the Universidade Federal de Santa Catarina, that provides not only data on poisonings and intoxications caused by venomous animals, but also operates a 24-hour call center for reporting incidents and offers educational material, including brochures for identifying species that pose a risk to the state's population. Although focused on snakebite incidents, another example of research based on accident reports (Araújo et al. 2023) revealed that, in addition to underreporting, there are errors or incomplete information on the forms.

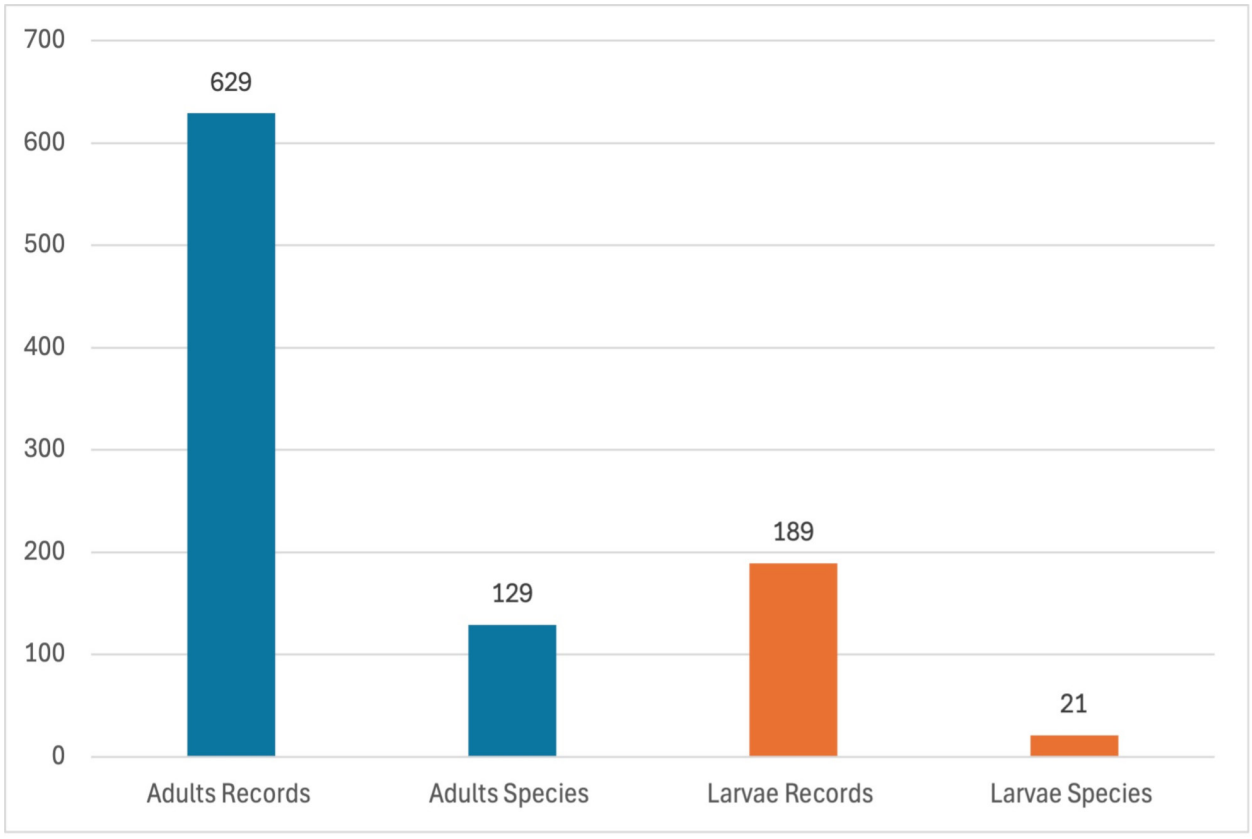

Figure 3. Total of records and species of Lepidoptera of medical relevance of the state of Rio de Janeiro based on *iNaturalist* database from October 2022 to January 2024. Adults are indicated in blue and larvae in orange.

This study highlighted the need for adequate training to ensure that health professionals can accurately complete the notification forms.

Regarding the Lepidoptera, the SINAN form for reporting accidents caused by venomous animals (Ministério da Saúde 2006) currently only focuses on incidents involving species of *Lonomia* (Saturniidae). Although the form includes an addendum (item 48) for reporting accidents caused by other Lepidoptera species, it only accounts for the larval stage. This is problematic because other genera within Saturniidae and additional Lepidoptera families are also of medical relevance (see Table I). While *Lonomia* species receive considerable attention, studies such as those conducted by Haddad Jr. & Cardoso (2003) have highlighted the prevalence of accidents caused by Megalopygidae species at the Hospital Vital Brazil in São Paulo. Moreover, toxin composition can vary significantly among different families of Lepidoptera (Diaz 2005) or even among species within the same genus (Anjos & Gonçalves 2021). These variations can result in distinct clinical reactions in victims, necessitating specialized treatment for each type of accident.

Megalopygidae and Saturniidae are generally considered the most Lepidoptera of medical relevance in Brazil, while other families are often regarded as less concerning (Instituto Butantan 2017, Ministério da Saúde 2024). However, severe accidents have been reported involving species of Erebidae (Cardoso et al. 2003) and Lasiocampidae (Specht 2008). In the absence of comprehensive toxicological and morphological comparative studies for Brazilian Lepidoptera, we recommend that all species listed in our study and previous literature be

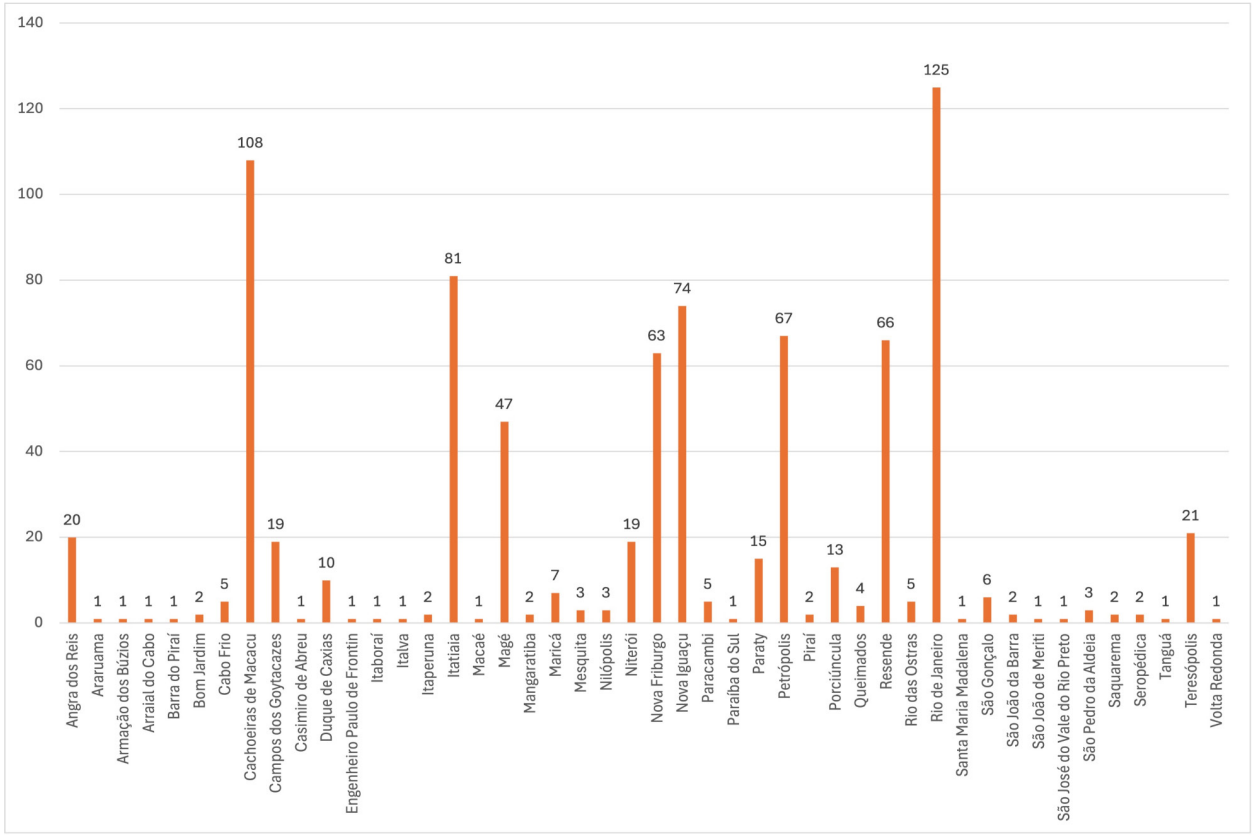

Figure 4. Occurrence records distribution per municipality of the Lepidoptera of medical relevance of the state of Rio de Janeiro based on *iNaturalist* database from October 2022 to January 2024. Municipalities with no occurrence records are not shown in the graphic.

regarded as equally medically relevant. These species should be included in public health databases and reporting forms. The SINAN form should be updated to include all six families of medical relevance for, at least, including all the six Lepidoptera families of medical relevance and provide options for distinguishing between the different life stages of the lepidopterans involved in accidents.

Are the clinical terminologies for Lepidoptera of medical relevance adequately applied?

Lepidoptera that cause injuries to humans are often described as venomous (*peçonhentos* in Portuguese), characterized by the active injection of toxins into prey and predators as a defense mechanism (Ministério da Saúde 2024). However, since neither adult nor larval Lepidoptera actively inject toxins into humans or their predators, this terminology should be reconsidered. In cases of erucism, injuries occur when mechanical pressure is applied to the larval setae or scoli, leading to their rupture and the release of toxins present in the insect's hemolymph. Alternatively, some sources use the term poisonous (*venenoso* in Portuguese) (e.g., Instituto Butantan 2017), but this terminology is also problematic. According to the Ministério da Saúde (2024), poisonous animals are those whose toxins only affect when ingested by predators. This situation highlights the need for a critical review of the terminology related to the Lepidoptera of medical relevance to ensure accurate and appropriate use of these terms.

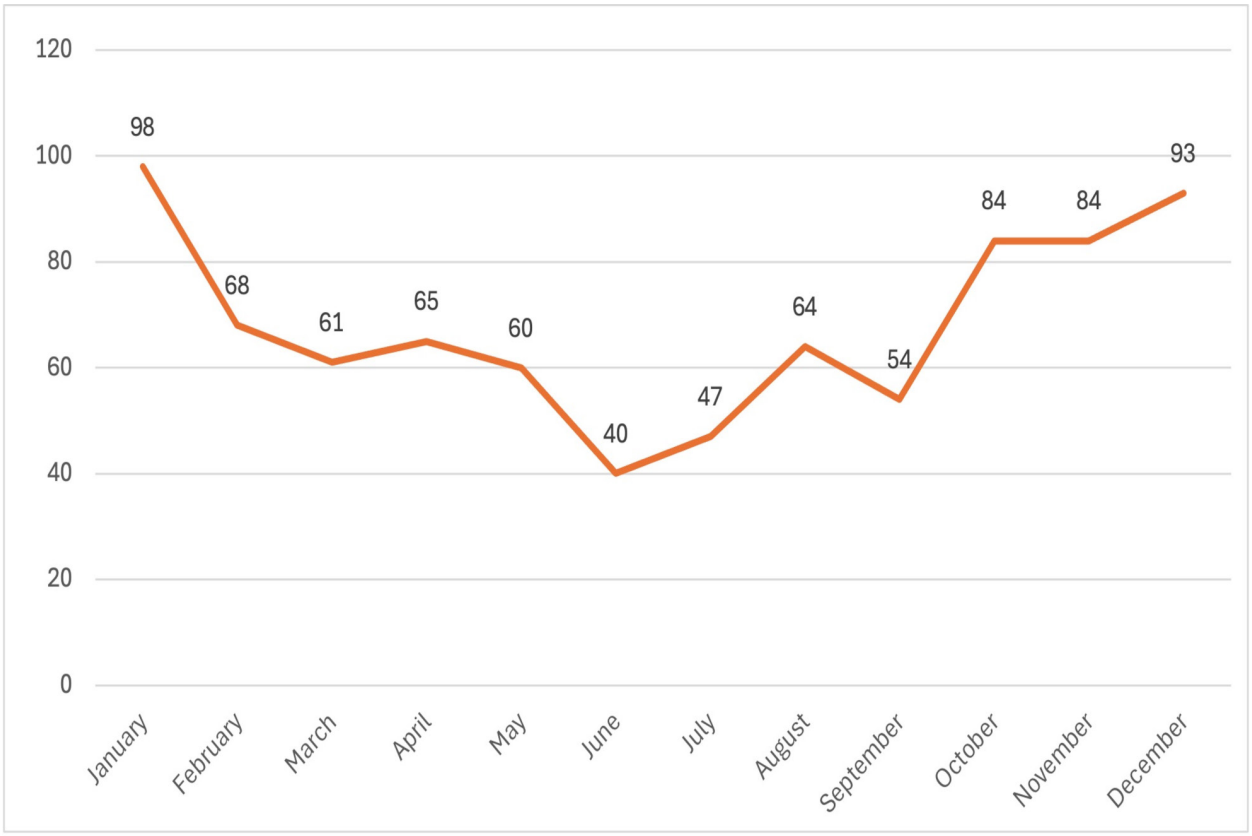

Figure 5. Monthly distribution of the occurrence records of the Lepidoptera of medical relevance of the state of Rio de Janeiro based on *iNaturalist* database from October 2022 to January 2024.

On *iNaturalist* and the importance of citizen science to expand the documentation of the Lepidoptera of medical relevance in the state of Rio de Janeiro

Using the *iNaturalist* database was crucial for compiling both the inferred list of species and the comprehensive list of Lepidoptera of medical relevance for the state of Rio de Janeiro. This citizen science tool is well-known for aiding researchers in conserving and monitoring Lepidoptera biodiversity and even providing the first records of rare species (Mesaglio et al. 2021). Approximately 40% of the Lepidoptera of medical relevance in the state of Rio de Janeiro are recorded in the *iNaturalist* database, and looking at the seasonality data from these species (Figure 5), the number of records is notably higher in summer, particularly in January (98 records) and December (93). While this data may suggest higher occurrence and/or abundance of species of medical relevance in the state during these months, it is important to consider that these months also coincide with school recess and holidays in Brazil. This likely results in increasing human activity in biological reserves and national parks, which could lead to more sightings and photographs of Lepidoptera. Additionally, as this data is sourced from *iNaturalist*, there is no information on the frequency of visits to recording sites by citizen scientists, which could influence the number of records. It is important to note that the records obtained from *iNaturalist* do not necessarily reflect the true seasonality of the Lepidoptera species. Further ecological and phenological studies are needed for Brazilian

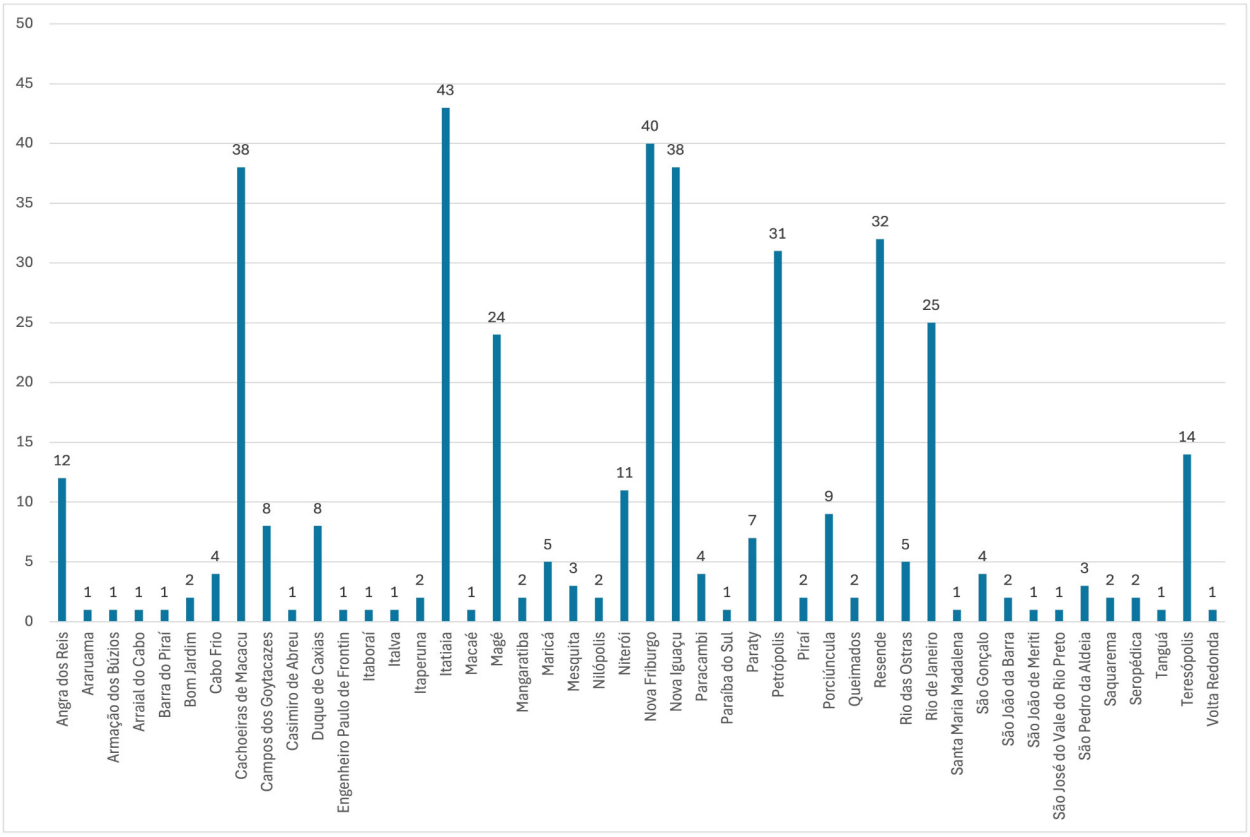

Figure 6. Richness per municipality of the Lepidoptera of medical relevance of the state of Rio de Janeiro based on *iNaturalist* database from October 2022 to January 2024. Municipalities with no occurrence records are not shown in the graphic.

species of medical importance to draw accurate conclusions about their seasonal patterns.

Most of the records on *iNaturalist* come from the municipality of Rio de Janeiro (Figure 5) likely due to its status as the most populous city and a major tourist destination. There is a notable discrepancy in the number of records when comparing species' richness by municipalities. For example, while the municipality of Rio de Janeiro ranks first in the number of records, it falls to seventh in terms of species richness. This can be illustrated by comparing Rio de Janeiro, which has records of 25 species, with Itatiaia, which has the highest number of species recorded in the database (43 species) (Figure 7). The five municipalities with the highest richness indicator on *iNaturalist* (Figure 6) are home to significant conservation units. These include the Tijuca National Park (Rio de Janeiro), Guapiaçu Ecological Reserve (Cachoeiras de Macacu), Itatiaia National Park, Tinguá Biological Reserve (Nova Iguaçu), Serra dos Órgãos National Park, and Petrópolis Environmental Protection Area. Similar to the case of seasonality, further studies are recommended to assess the richness of species of medical relevance in the municipalities of Rio de Janeiro to help eliminate demographic, tourism, and other potential biases.

Challenges in identifying the Brazilian Lepidoptera of medical relevance: the critical role of future taxonomic and natural history studies

A comprehensive taxonomic revision of all species compiled here is beyond the scope of this study although extremely necessary. In

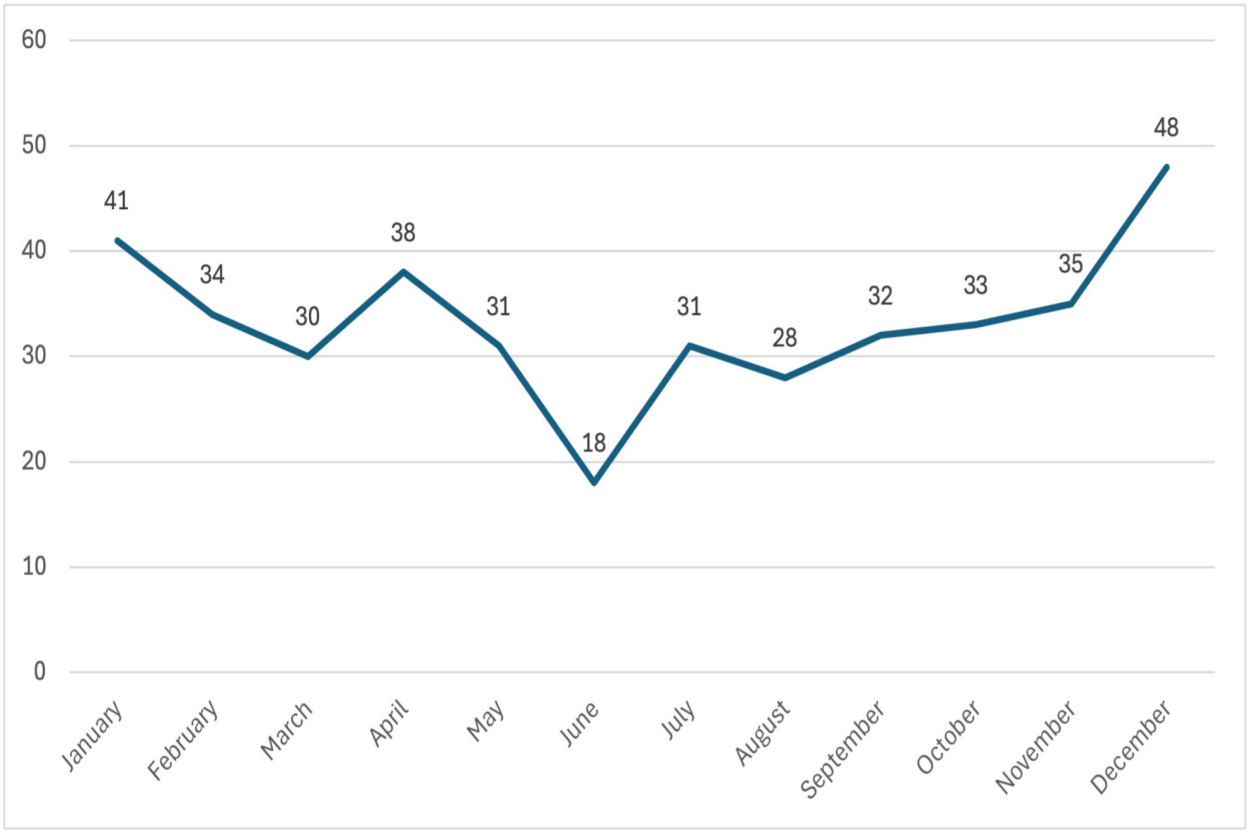

Figure 7. Monthly distribution of the richness of the Lepidoptera of medical relevance of the state of Rio de Janeiro based on *iNaturalist* database from October 2022 to January 2024.

Brazil, most studies on taxonomy and natural history of Lepidoptera still relies on butterflies (Papilionoidea) and there is scarce or complete absence of information for most of the other superfamilies that comprise the moths. That makes it challenging to verify and confirm the taxonomic identity of most of the species compiled from literature. Among the limited taxonomic studies on the genera compiled in our study, we highlight the taxonomic revision of the genus *Trosia* (Hübner, 1820). This revision indicates that *Trosia*, as originally defined, now encompasses four genera (Becker 2022). In that study, *Trosia placida* (Jones, 1912) was transferred to *Endobrachys* C. Felder & R. Felder, 1874, a genus that had not previously been cited in the literature as having medical relevance. Consequently, *E. revocans* C. Felder & R. Felder, 1874 cited in Becker (2022) is also included in our list, as it is being cited as medically relevant for the first time.

While platforms like *iNaturalist* and other citizen science initiatives can aid in cataloging biodiversity and even discovering new taxa, they have significant limitations when it comes to accurately identifying species based solely on photographs, even for experienced taxonomists. In the case of Lepidoptera, many cryptic or mimetic species exhibit very similar wing coloration patterns, making it essential to conduct detailed morphological examinations or molecular analyses to correctly identify the taxa (e.g. Janzen et al. 2012, Decaëns et al. 2021). This challenge becomes even more pronounced when considering immature stages, as studies on the life cycles and natural history of most Brazilian Lepidoptera species are scarce, with a few encompassing lepidopteran of medical

relevance (e.g. Lorini & Corseuil 2001, Specht et al. 2006b, Piovesan et al. 2023). Despite these difficulties, we view the identification suggestions provided by *iNaturalist* and similar platforms as valuable starting points since biases can be detected and corrected, improving the quality of those databases (Mesaglio & Callaghan 2021). This is particularly true because several taxonomists have also contributed to the revision of identifications on these platforms (Campbell et al. 2023).

CONCLUSIONS

The data compilation presented here represents an initial step toward a better understanding on the Lepidoptera of medical relevance from the state of Rio de Janeiro, paving the way for more detailed studies on this subject. The findings from this study also enhance our knowledge on the lepidopteran fauna in the state, the Atlantic Forest and Brazil as a whole. Future steps involve expanding the dissemination of the information by creating scientific outreach materials and educational booklets for the general public, health professionals, and state and municipal health departments in the state of Rio de Janeiro which is already being developed by the Laboratório de Pesquisas de Lepidoptera (LaPeL) in ongoing projects on this topic. The goal is to aid in the accurate identification of Lepidoptera, thereby improving accident documentation, providing more effective care, and ensuring more precise diagnoses and treatments for victims. While often viewed negatively due to their potential to cause accidents in humans, it is important to recognize that Lepidoptera serve as a vital food source for various animals, even the *Lonomia* caterpillars as reported in Favalesso et al. (2020). Some species of medical importance are also acknowledged as important bioindicators in their adult stage (Braga & Diniz 2018). Rather than promoting the elimination of these Lepidoptera, we should encourage more research to understand their ecological, phenological, and behavioral aspects. This knowledge is essential for developing sustainable strategies for controlling and monitoring these species during population outbreaks in the country.

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