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Papilionoidea inventory of the Sempre Vivas National Park, Minas Gerais State, southeastern Brazil (Insecta: Lepidoptera)

L. D. Silva, A. H. Batista-Rosa, A. V. L. Freitas, C. A. Iserhard, L. A. Kaminski, O. J. Marini-Filho, B. M. Thompson, G. R. Soares & M. M. de Sousa

Abstract

This paper provides a preliminary inventory of the Lepidoptera from the Sempre Vivas National Park, a mountain area (1200 to 1400 m a.s.l.) that combines savannas (Cerrado) and open rocky montane fields (campos rupestres) in the north-central region of Minas Gerais, Brazil. Collections were made by active search using nets and Van Someren-Rydon bait traps in two periods: one from 2010 to 2011 (10 sampling days) and the other from 2018 to 2019 (20 sampling days). A total of 1181 individuals of 238 species were sampled, distributed in 18 subfamilies of six Lepidoptera families. Noteworthy were the records of *Rhetus belphegor* (Westwood, [1851) (Riodinidae), *Magnastigma julia* (Lycaenidae), and *Strymon ohausi* (Spitz, 1933) (Lycaenidae), species included in the Brazilian Red List of threatened Lepidoptera. Five species endemic to the Cerrado biome were reported, namely *Cogia cerradicola* (Mielke, 1967) (Hesperiidae), *Parides bunichus diodorus* (Hopffer, 1866) (Papilionidae), *Nhambikuara cerradensis* Freitas, Barbosa & Zacca, 2018, *Yphthimoides cipoensis* Freitas, 2004 (Nymphalidae), and *Sertania jaibensis* (Callagham & Soares, 2001) (Riodinidae). Although preliminary, the information presented here is important for the management of the Sempre Vivas National Park and contributes to a crucial body of data to support actions for the conservation of the Cerrado biome in Brazil.
KEY WORDS: Insecta, Lepidoptera, Papilionoidea, Cerrado, Hesperiidae, Nymphalidae, Bait traps, Brazil.

Inventário de Papilionoidea do Parque Nacional Sempre Vivas, Estado de Minas Gerais, sudeste do Brasil (Insecta: Lepidoptera)

Resumo

O presente trabalho apresenta um inventário preliminar das Lepidoptera do Parque Nacional das Sempre Vivas, uma área montanhosa (1200 to 1400 m de altitude) que combina vegetação de Cerrado e de campos rupestres na região centro-norte de Minas Gerais, Brasil. As coletas foram feitas com busca ativa usando redes e com armadilhas atrativas modelo Van Someren-Rydon, em dois períodos distintos: entre 2010 e 2011 (dez dias de amostragem), e entre 2018 e 2019 (20 dias de amostragem). Foram coletados 1181 indivíduos de 238 espécies, distribuídas em 18 subfamílias de seis famílias de Lepidoptera. Destaca-se o registro das espécies *Rhetus belphegor* (Westwood, [1851]) (Riodinidae), *Magnastigma julia* e *Strymon ohausi* (Spitz, 1933) (ambas Lycaenidae), todas na lista das ameaçadas de extinção do Brasil. Adicionalmente, foram registradas cinco espécies endêmicas do Bioma Cerrado, a saber: *Cogia cerradicola* (Mielke, 1967) (Hesperiidae), *Parides bunichus diodorus* (Hopffer, 1866) (Papilionidae), *Nhambikuara cerradensis* Freitas, Barbosa & Zacca, 2018, *Yphthimoides cipoensis* Freitas, 2004 (Nymphalidae) e *Sertania jaibensis* (Callagham & Soares, 2001) (Riodinidae). Apesar de preliminar, as informações

aqui apresentadas são importantes não apenas para a gestão do Parque, mas também irão contribuir para formar um corpo de dados crucial para subsidiar ações de conservação do Bioma Cerrado no Brasil.
PALAVRAS-CHAVE: Insecta, Lepidoptera, Papilionoidea, Cerrado, Hesperiidae, Nymphalidae, armadilhas atrativas, Brasil.

Inventario de Papilionoidea del Parque Nacional Sempre Vivas, Estado de Minas Gerais, sudeste de Brasil (Insecta: Lepidoptera)

Resumen

Este trabajo presenta un inventario preliminar de los Lepidoptera del Parque Nacional Sempre Vivas, un área de montaña (1.200 a 1.400 m s.n.m.) que combina sabanas (Cerrado) y campos rocosos abiertos de montaña (campos rupestres) en la región centro-norte de Minas Gerais, Brasil. Las recolecciones se realizaron mediante búsqueda activa con redes y trampas de cebo Van Someren-Rydon en dos periodos: uno de 2010 a 2011 (10 días de muestreo) y otro de 2018 a 2019 (20 días de muestreo). Se muestrearon 1.181 individuos de 238 especies, distribuidos en 18 subfamilias de seis familias de Lepidoptera. Destacan los registros de *Rhetus belphegor* (Westwood, [1851]) (Riodinidae), *Magnastigma julia* (Lycaenidae) y *Strymon ohausi* (Spitz, 1933) (Lycaenidae), especies incluidas en la Lista Roja de mariposas amenazadas de Brasil. Se reportaron cinco especies endémicas del bioma del Cerrado: *Cogia cerradicola* (Mielke, 1967) (Hesperiidae), *Parides bunichus diodorus* (Hopffer, 1866) (Papilionidae), *Nhambikuara cerradensis* Freitas, Barbosa & Zacca, 2018, *Yphthimoides cipoensis* Freitas, 2004 (Nymphalidae) y *Sertania jaibensis* (Callagham & Soares, 2001) (Riodinidae). Aunque preliminar, la información presentada aquí es importante para la gestión del Parque Nacional Sempre Vivas y contribuye a un cuerpo de datos crucial para apoyar las acciones de conservación del bioma del Cerrado en Brasil.
PALABRAS CLAVE: Insecta, Lepidoptera, Papilionoidea, Cerrado, Hesperiidae, Nymphalidae, trampas de cebo, Brasil.

Introduction

Neotropical Cerrado savannas cover extensive areas in northeastern Brazil, where they intermix with Caatinga dry forests, extending obliquely toward the southwest until reaching the boundaries of Pantanal and Chaco and, thereby, dividing two large, forested biomes, the Amazon and the Atlantic Forest (OLIVEIRA & MARQUIS, 2002). This region is considered an important biodiversity hotspot for combining a high rate of endemism and threats (MYERS *et al*., 2000). The area of Cerrado savannas has decreased in recent decades as a result of policies that prioritize the expansion of agricultural frontiers in Brazil (OLIVEIRA-FILHO, 2006; OLIVEIRA-FILHO & RATTER, 2002). Thus, effective public policies aiming at the conservation of Cerrado remnants are urgently needed to maintain biodiversity and, consequently, preserve ecosystem services (KLINK & MACHADO, 2005; STRASSBURG *et al*., 2017). For the proposal of new conservation actions and monitoring strategies, it is necessary to obtain information on Cerrado species, their geographical distributions and temporal patterns, and the ecology and natural history of groups occupying preserved Cerrado areas (BROWN & GIFFORD, 2002; CAVALCANTI & JOLY, 2002; PINHEIRO *et al*., 2010).

Biological inventories, that is, complete and well-represented lists of local species, are fundamental to the knowledge of the geographic distribution of organisms and development of environmental agendas, including conservation priorities and management programs (SANTOS *et al*., 2008; SILVEIRA *et al*., 2010). Insect inventories are prioritized because of the ecological relevance of these organisms to terrestrial and aquatic ecosystems. Insects are involved in several ecological processes, such as pollination, suppression of plant species through herbivory, predation of other insects and animals, and nutrient cycling; furthermore, insects are important components of virtually all food webs (MORSE, 1971; BARBOLA *et al*., 2007; POTTS *et al*., 2016; SCHOWALTER *et al*., 2018). Given such a close relationship with other organisms, several insect groups are used as indicators of

anthropogenic disturbances (i.e., biological indicators), particularly Lepidoptera (BROWN, 1991; FREITAS *et al*., 2003; FREITAS *et al*., 2006).

Despite the growing knowledge of Brazilian Lepidoptera, inventories of Cerrado areas are still local, sparse, and underrepresented, mostly concentrated in the Central-West and Highlands (see BROWN & MIELKE 1967 a, b; BROWN & MIELKE 1968; PINHEIRO & ORTIZ 1992; EMERY *et al*., 2006; PINHEIRO & EMERY, 2006). Thus, there is a lack of information about butterflies occurring in southern Cerrado, transition zones between biomes, and elevated regions, in which Cerrado vegetation is replaced by natural, open, rocky montane vegetation, known locally as campo rupestre (see SOARES *et al*., 1999; GOZZI *et al*., 2012; NERY *et al*., 2014; PIRES *et al*., 2018; HENRIQUES *et al*., 2019; SOLDATI *et al.,* 2019; FREITAS *et al*., 2021a). This survey provides an inventory of butterflies occurring in the Sempre Vivas National Park (SVNP), an area covered by Cerrado and campo rupestre vegetation in the north-central region of Minas Gerais State, Brazil.

Material and methods

The study was carried out in the Sempre Vivas National Park (SVNP) (17º55'S 43º47'W), a reserve that encompasses areas in the municipalities of Diamantina, Olhos D'Água, Bocaiúva, and Buenópolis, north-central Minas Gerais State, southeastern Brazil. The SVNP is located in the Serra do Espinhaço and extends over an area of approximately 124,156 ha, covered by a mosaic of different phytophysiognomies, such as riparian forest, seasonal semideciduous forest, several Cerrado physiognomies (such as Cerrado savannas *sensu stricto*, arboreal formations such as cerradão, and open vegetation such as campo limpo), and a high representation of campo rupestre. The climate is humid subtropical with dry winters and temperate summers (Cwb in the Köppen climate classification) (ÁLVARES *et al*., 2014). Altitudes range from 1200 to 1400 m a.s.l., and the annual precipitation is between 1300 and 1600 mm (ÁLVARES *et al*., 2014).

Samplings took place at 10 sampling sites over two periods: (1) two expeditions of five consecutive days each in April 2010 and May 2011 and (2) four expeditions of five consecutive days each in October 2018 and January, February, and March 2019 (Table I). Samplings were carried out between 9:00 a.m. and 5:00 p.m. (about 8 h of sampling effort per day) by active search using entomological nets, according to the protocols proposed by BROWN (1972), FREITAS *et al*. (2003), and FREITAS *et al.* (2021b), totaling 240 h of sampling effort over the two periods. Additionally, baited traps (Van Someren-Rydon traps) were used to attract fruit-feeding butterflies, following a protocol adapted from FREITAS *et al*. (2014). Ten traps were placed 20 m away from each other in areas of open vegetation, forest, and forest edges and left in the field for five consecutive days per expedition, totaling 480 h of sampling effort per trap. The bait used was a mixture of fermented banana and sugarcane juice, prepared 48 h before sampling. Collections were restricted to individuals whose identification in the field was difficult or doubtful, in which case the collected specimens were taken to the laboratory for later identification and deposited in zoological collections. Species identification was carried out by authors with experience in the field, supported by specialized literature and comparisons with the illustrated list on the webpage "Butterflies of America" (WARREN *et al*., 2016) and specimens previously identified and deposited in museums. The classification used follows the checklist published by LAMAS (2004), modified according to WARREN *et al*. (2009), CONG *et al*. (2019), LI *et al*. (2019), and ZHANG *et al*. (2019) for Hesperiidae; SERAPHIM *et al*. (2018) for Riodinidae; WAHLBERG *et al*. (2009) for Nymphalidae; and ZACCA *et al.* (2018) for Euptychiina. Collection, storage, and preparation procedures were performed according to FREITAS *et al*. (2021c). Six families of diurnal butterflies were sampled (family Hedylidae was not included). Collected specimens were deposited in one of the following three scientific collections: (1) Coleção Zoológica do Museu de Diversidade Biológica da Universidade Estadual de Campinas (ZUEC), Campinas, São Paulo, Brazil; (2) Centro Nacional de Pesquisa e Conservação da Biodiversidade do Cerrado e Caatinga do Instituto Chico Mendes de Conservação da Biodiversidade (CECAT), Brasília, Distrito Federal,

Brazil; or (3) Coleção do Laboratório de Zoologia, do Instituto Federal de Educação, Ciências e Tecnologia do Sul de Minas (CBVS), Campus Inconfidentes, Inconfidentes, Minas Gerais, Brazil.

Table I.– Sampling sites, coordinates, and phytophysiognomies where butterfly individuals were collected in the Sempre Vivas National Park, Minas Gerais, southeastern Brazil.

Locality	**Geographical coordinates**	**Phytophysiognomies**
Base	17.917200ºS 43.786910ºW	Campo limpo and riparian forest
Baliza	17.889685ºS 43.731034ºW	Campo limpo and riparian forest
Cachoeira Santa Rita	17.95820ºS 43.93301ºW	Cerrado, cerrado sensu stricto, and riparian forest
Córrego do Durão	17.882715ºS 43.837921ºW	Cerrado, cerrado sensu stricto, and riparian forest
Nhacica	17.846020ºS 43.763150ºW	Campo rupestre and campo limpo
Os Felipe	17.906360ºS 43.709300ºW	Campo rupestre, cerrado sensu stricto, and riparian forest
Rio Jequitaí	17.889999ºS 43.805292ºW	Cerrado sensu stricto, campo limpo and riparian forest
Rio Jequitinhonha	16.502936ºS 41.026484ºW	Cerrado and riparian forest
Rio Preto	17.929697ºS 43.809616ºW	Campo rupestre, cerrado sensu stricto, campo limpo, and riparian forest
Rio Tamanduá	17.972718ºS 43.779833ºW	Cerrado and riparian forest

Results

A total of 1181 individuals belonging to 238 species were collected/recorded, distributed in six families of Lepidoptera (Appendix I). The family with the highest species richness was Hesperiidae, with 73 species (30.7%), followed by Nymphalidae (n = 65, 27.3%), Lycaenidae (n = 42, 17.7%), Riodinidae (n = 37, 15.5%), Pieridae (n = 15, 6.3%), and Papilionidae (n = 6, 2.5%) (Appendix I).

Of the Lepidoptera species inventoried in this study, three are included in the Brazilian Red List of threatened fauna (MMA, 2014): (1) *Magnastigma julia* Nicolay, 1977 (Lycaenidae) (endangered); (2) *Strymon ohausi* (Spitz, 1933) (Lycaenidae) (endangered); and (3) *Rhetus belphegor* (Westwood, 1851) (Riodinidae) (critically endangered). At least five species are endemic to the Cerrado biome: (1) *Cogia cerradicola* (Mielke, 1967) (Hesperiidae); (2) *Parides bunichus diodorus* (Hopffer, 1865) (Papilionidae); (3) *Nhambikuara cerradensis* Freitas, Barbosa & Zacca, 2018 (Nymphalidae); (4) *Yphthimoides cipoensis* Freitas, 2004 (Nymphalidae); and (5) *Sertania jaibensis* (Callaghan & Soares, 2001) (Riodinidae).

Discussion

Although species richness was relatively low in the SVNP compared with other Neotropical sites (see BROWN 2005 and the discussion below), the present list can be considered representative of the SVNP Lepidoptera assemblage for the following reasons: (1) expeditions were well spaced in time, including periods characteristically known to have high species richness in the region and occurrence of univoltine species (see BROWN, 1972), (2) the team was composed of researchers

with vast experience in butterfly inventories, and (3) the richness of Hesperiidae species was greater than that of Nymphalidae species, a characteristic also observed in complete inventories of Lepidoptera in the Atlantic Forest and Cerrado (FRANCINI *et al*., 2011; ISERHARD *et al.,* 2017). In summary, although many additions of species are expected in all six families represented here, this list may adequately represent richness patterns of the SVNP Rhopalocera assemblage.

Inventories in forested biomes, such as the Atlantic Forest and Amazon, generally comprise more than 500 species (e. g., BROWN JR. & FREITAS, 2002; BROWN, 2005; MIELKE *et al*., 2010; FRANCINI *et al*., 2011; BELTRAMI *et al*., 2014; GARCIA-SALIK *et al*., 2014; FREITAS *et al*., 2016), as do inventories carried out in central Cerrado areas (EMERY *et al*., 2006; MIELKE *et al*., 2008). The species richness recorded here is comparable to that obtained in relatively well-sampled areas of southern Cerrado (CASAGRANDE *et al*., 2012), sites in ecotone with the Atlantic Forest (also known as transition zones) (BROWN & MIELKE, 1968; SOLDATI *et al*., 2019), and in similar areas of campo rupestre (PIRES *et al*., 2018; HENRIQUES *et al*., 2019). Some groups were clearly undersampled, and their richness would likely increase with some additional visits. For example, the subfamily Ithomiini (Nymphalidae: Danainae) had only three sampled species, but, according to other lists from the Cerrado, this number could increase to 15 or more. A good strategy is to visit riparian forests during the dry season, when Ithomiini species can usually be found in large groups in humid, shaded environments. Other poorly sampled groups were two genera of the family Nymphalidae, *Adelpha* (Limenitidinae) and *Actinote* (Heliconiinae), both with only one sampled species. These two genera are usually represented by eight or more species in similar habitats; the number of sampled species could increase with additional visits in March and April.

Finally, it is worth noting that, although richness was not very high, three threatened species were recorded in the SVNP, namely *M. julia*, *S. ohausi*, and *R. belphegor*, all associated with open formations of Cerrado and campo rupestre (FREITAS & MARINI-FILHO, 2011; KAMINSKI *et al*., 2015; ICMBio, 2018). By contrast, no threatened species were identified in the Baixada Santista region, São Paulo State, where more than 500 species were recorded (FRANCINI *et al*., 2011). Furthermore, some endemic species of the Cerrado were recorded, such as *Sertania jaibensis*, which was previously observed in only two localities (CALLAGHAN & SOARES, 2001; KAMINSKI *et al*., 2017). The Serra do Espinhaço region is very peculiar and important to several fauna and flora species, extending over a small area (compared to the Cerrado as a whole) from Minas Gerais to Bahia States. Thus, we highlight the importance of preserved areas in unique landscapes such as campo rupestre in the SVNP. This area, belonging to the Cerrado domain, preserves and maintains various populations of endangered and endemic species in Brazil, representing a crucial and singular ecosystem to the biodiversity of Brazilian elevated regions.

Taxonomic composition

As previously mentioned, the SVNP list reflects the richness distribution of Brazilian species lists, with Hesperiidae being more represented than Nymphalidae (BROWN & FREITAS, 1999). Such a family composition is evidence that the inventory constituted a representative sampling effort (FRANCINI *et al*., 2011). This is due to the fact that Nymphalidae has a greater proportion of species that are common and easily detectable, leading to a high accumulation of species in the first expeditions. By contrast, Hesperiidae, Lycaenidae, and Riodinidae show a slower rate of species accumulation, given that these individuals are generally furtive and low in abundance (BROWN & FREITAS, 2000; ISERHARD *et al*., 2013, 2017a). Thus, these groups demand greater collection effort and time to obtain a well-represented inventory (e.g., BROWN & FREITAS, 2000: Table 3; LAMAS *et al*., 2021). Inventories carried out with low sampling efforts tend to show greater Nymphalidae than Hesperiidae richness, although local richness is usually greater in the latter family.

A second pattern observed here was the relative proportions of Lycaenidae and Riodinidae.

Previous studies suggested that Lycaenidae predominate over Riodinidae in colder sites of the Atlantic Forest, including southern localities and highlands (ISERHARD & ROMANOWSKI, 2004; ISERHARD *et al*., 2010; BELLAVER *et al*., 2012). Riodinidae, by contrast, is more frequent than Lycaenidae in lowlands, northern regions, and the interior of the Atlantic Forest (FRANCINI *et al*., 2011). Therefore, the SVNP inventory, carried out in a mountainous region with elevations of up to 1600 m a.s.l., is in accordance with this pattern, given that Lycaenidae was better represented than Riodinidae. The reasons for this pattern are unknown; however, warmer climates seem to favor sampling of the latter in relation to the former. According to BROWN (2005), several Amazon sites, including some that exhibit the highest butterfly species richness, follow this pattern, with reports of a significant positive relationship between Riodinidae richness and mean annual temperature. In the current study, the difference in richness between the two families was small, but it is expected that with more collections, the relative proportion between Lycaenidae and Riodinidae may change.

Conclusion

Given the importance of knowledge about Neotropical Lepidoptera, the inclusion of well-represented inventories is crucial to cover the lack of information on the occurrence and distribution of Lepidoptera in Brazil. This study represents an important contribution to such knowledge, including Lepidoptera that occur in montane sites within the Cerrado biome, where savannas are replaced by campo rupestre. In general, these habitats are spatially restricted and extremely sensitive to human disturbances and climate change, in addition to harboring several endemic and endangered species. Thus, knowledge of the diversity of these ecosystems is essential to support future conservation actions, including monitoring and management of protected areas (as in the present case), and to identify and propose priority areas for conservation. This survey has great relevance and is in accordance with the aims proposed by the National Plan for the Conservation of Threatened Lepidoptera, a great effort involving several researchers and the ICMBio Environmental Agency to increase the knowledge of Lepidoptera in all Brazilian biomes. Thus, this list holds valuable information not only for the management of the SVNP but also, combined with other campo rupestre inventories, for the consolidation of a more robust body of information to support actions aimed at the conservation of Cerrado biodiversity in Brazil.

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L. D. S.
Instituto Federal de Educação, Ciência e Tecnologia do Sul de Minas Gerais
Campus Inconfidentes,
Inconfidentes, Minas Gerais
BRASIL / *BRAZIL*
E-mail: lauana.silva@alunos.ifsuldeminas.edu.br
https://orcid.org/0000-0002-6549-2259

*A. H. B. R.
Departamento de Biologia Animal e Museu de Diversidade Biológica
Instituto de Biologia, Universidade Estadual de Campinas (Unicamp)
Campinas, São Paulo
BRASIL / *BRAZIL*
E-mail: augustohbrosa@hotmail.com
https://orcid.org/0000-0002-0151-114X

A. V. L. F.
Departamento de Biologia Animal e Museu de Diversidade Biológica
Instituto de Biologia
Universidade Estadual de Campinas
Campinas, São Paulo
BRASIL / *BRAZIL*
E-mail: baku@unicamp.br
https://orcid.org/0000-0002-5763-4990

C. A. I.
Programa de Pós-Graduação em Biologia Animal
Departamento de Ecologia, Zoologia e Genética
Instituto de Biologia
Universidade Federal de Pelotas
Pelotas, Rio Grande do Sul
BRASIL / *BRAZIL*
E-mail: cristianoagra@yahoo.com.br
https://orcid.org/0000-0001-6414-9216

L. A. K
Departamento de Zoologia
Universidade Federal do Rio Grande Sul
Porto Alegre, Rio Grande do Sul
BRASIL / *BRAZIL*
E-mail: lucaskaminski@yahoo.com.br
https://orcid.org/0000-0002-6468-0960

O. J. M.
Centro Nacional de Avaliação da Biodiversidade e de Pesquisa e Conservação do Cerrado,
Instituto Chico Mendes de Conservação da Biodiversidade
Brasília, Distrito Federal
BRASIL / *BRAZIL*
E-mail: o.marini@gmail.com
https://orcid.org/0000-0003-4857-0865

B. M. Th.
Centro Nacional de Avaliação da Biodiversidade e de Pesquisa e Conservação do Cerrado
Instituto Chico Mendes de Conservação da Biodiversidade
Brasília, Distrito Federal
BRASIL / *BRAZIL*
E-mail: barbaramoraist@gmail.com
https://orcid.org/0000-0002-5206-2831

G. R. S.
Pesquisadora independente
Ouro Preto, Minas Gerais
BRASIL / *BRAZIL*
E-mail: biogloria@yahoo.com.br
https://orcid.org/0000-0001-6524-8654

M. M. S.
Instituto Federal de Educação, Ciência e Tecnologia do Sul de Minas Gerais
Campus Inconfidentes
Inconfidentes, Minas Gerais
BRASIL / *BRAZIL*
E-mail: marcos.souza@ifsuldeminas.edu.br
https://orcid.org/0000-0003-0415-1714

*Autor para la correspondencia / *Corresponding author*

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Appendix I.– List of Papilionoidea species recorded in the Sempre Vivas National Park, Minas Gerais, southeastern Brazil. The total number of species in each taxon is indicated in parentheses.

HESPERIIDAE (73)
PYRRHOPYGINAE (10)
Elbella sp.
Mimoniades (*Mahotis*) *versicolor* (Latreille, [1824])
Mysoria (*Mysoria*) *barcastus barta* Evans, 1951
Mysoria (*Sarbia*) *damippe* Mabille & Boullet, 1908
Mysoria (*Sarbia*) *xanthippe* (Latreille, [1824])
Mysoria (Sarbiena) *catomelaena* Mabille & Boullet, 1908
Passova polemon (Hopffer, 1874)
Pyrrhopyge charybdis Westwood, 1852
Pyrrhopyge pelota Plötz, 1879
Pyrrhopyge sp.
EUDAMINAE (15)
Autochton (*Autochton*) *integrifascia* (Mabille, 1891)
Autochton (*Autochton*) *itylus* Hübner, 1823
Autochton (*Autochton*) *neis* (Geyer, 1832)
Cecropterus (*Murgaria*) *barra* Evans, 1952
Cecropterus (*Thorybes*) *dorantes* (Stoll, [1790])
Chioides catillus (Cramer, 1779)
Cogia calchas (Herrich-Schäffer, 1869)
Cogia cerradicola (O. Mielke, 1967)
Cogia grandis Riley, 1921
Spicauda cindra Evans, 1952
Spicauda simplicius (Stoll, [1790])
Spicauda teleus (Hübner, 1821)
Udranomia spitzi (Hayward, 1942)
Urbanus (*Urbanus*) *proteus* (Linnaeus, 1758)
Urbanus (*Urbanus*) *velinus* (Plötz, 1880)
HESPERIINAE (27)
Callimormus saturnus (Herrich-Schäffer, 1869)
Cobalopsis sp.
Cymaenes uruba uruba (Plötz, 1886)
Cymaenes warreni (Weeks, 1901)
Euphyes cherra Evans, 1955
Hedone vibex catilina (Plötz, 1886)
Hylephila phyleus (Drury, 1773)
Justinia kora (Hewitson, 1877)
Miltomiges cinnamomea (Herrich-Schäffer, 1869)
Mnaseas bicolor inca Bell, 1930
Morys subgrisea subgrisea (Mabille, 1898)
Mucia scitula (Hayward, 1951)
Orthos sp.
Panoquina peraea (Hewitson, 1866)
Pompeius amblyspila (Mabille, 1898)
Quasimellana mielkei Burns, 1994
Rufocumbre eberti (Evans, 1955)
Synale elana (Plötz, 1882)
Synale metella (Plötz, 1882)
Veadda veadeira O. Mielke, 1968
Vehilius inca (Scudder, 1872)
Vernia dares (Plötz, 1883)
Vidius nostra Evans, 1955
Vidius similis O. Mielke, 1980
Vidius spitzi O. Mielke, 1967
Wallengrenia otho clavus (Erichson, [1849])
Xeniades chalestra (Hewitson, 1866)
PYRGINAE (21)
Anastrus ulpianus Poey, 1832
Anisochoria minorella Mabille, 1898
Burnsius orcus (Stoll, 1780)
Chiothion asychis autander (Mabille, 1891)
Chiothion basigutta (Plötz, 1884)
Cycloglypha thrasibulus (Fabricius, 1793)
Gesta (*Gesta*) *gesta* (Herrich-Schäffer, 1863)
Gorgythion begga (Prittwitz, 1868)
Eantis mithridates thraso (Hübner, [1807])
Helias phalaenoides palpalis (Latreille, [1824])
Heliopetes (*Heliopetes*) *arsalte* (Linnaeus, 1758)
Heliopetes (*Heliopetes*) *orbigera* (Mabille, 1888)
Heliopetes (*Leucoscirtes*) *libra* Evans, 1944
Heliopetes (*Leucoscirtes*) *omrina* (A. Butler, 1870)
Incisus incisus (Mabille, 1878)
Pellicia dimidiata zamia Plötz, 1882
Timochares trifasciata (Hewitson, 1868)
Timochreon doria (Plötz, 1884)
Viola violella (Mabille, 1898)
Zopyrion evenor Godman, 1901
Zopyrion reticulata Hayward, 1942
LYCAENIDAE (42)
POLYOMMATINAE (2)
Hemiargus hanno (Stoll, [1790])
Leptotes cassius (Cramer, 1775)
THECLINAE (40)
Allosmaitia strophius (Godart, [1824])
Arawacus binangula (Schaus, 1902)
Arawacus ellida (Hewitson, 1867)
Arawacus tarania (Hewitson, 1868)
Atlides rustan (Stoll, [1790])
Badecla badaca (Hewitson, 1868)
Bistonina mantica (H. Druce, 1907)
Calycopis caulonia (Hewitson, 1877)
Chlorostrymon telea (Hewitson, 1868)
Cyanophrys sp.
Erora tella (Schaus, 1902)
Magnastigma hirsuta (Prittwitz, 1865)
Magnastigma julia Nicolay, 1977
Ministrymon azia (Hewitson, 1873)
Nicolaea cauter (H. Druce, 1907)
Nicolaea laconia (Hewitson, 1868)
Nicolaea socia (Hewitson, 1868)
Ostrinotes empusa (Hewitson, 1867)
Paiwarria aphaca (Hewitson, 1867)
Parrhasius polibetes (Stoll, 1781)

Pseudolycaena marsyas (Linnaeus, 1758)
Rekoa marius (Lucas, 1857)
Rekoa palegon (Cramer, 1780)
Strymon bubastus (Stoll, 1780)
Strymon cestri (Reakirt, [1867])
Strymon crambusa (Hewitson, 1874)
Strymon lucena (Hewitson, 1868)
Strymon mulucha (Hewitson, 1867)
Strymon ohausi (Spitz, 1933)
Strymon rufofusca (Hewitson, 1877)
Strymon serapio (Godman & Salvin, 1887)
Strymon tegaea (Hewitson, 1868)
Strymon ziba (Hewitson, 1868)
Strymon sp. 1
Strymon sp. 2
Symbiopsis lenitas (H. Druce, 1907)
Thepytus sp.
Thereus sp.
Theritas triquetra (Hewitson, 1865)
Thestius lycabas (Cramer, 1777)
NYMPHALIDAE (65)
BIBLIDINAE (11)
Biblis hyperia nectanabis (Fruhstorfer, 1909)
Callicore astarte selima (Guenée, 1872)
Callicore sorana (Godart, [1824])
Dynamine postverta (Cramer, 1779)
Dynamine tithia (Hübner, [1823])
Eunica bechina magnipunctata Talbot, 1928
Eunica cuvierii (Godart, 1819)
Eunica sydonia (Godart, [1824])
Hamadryas februa (Hübner, [1823])
Pyrrhogyra sp.
Temenis laothoe (Cramer, 1777)
CHARAXINAE (3)
Fountainea ryphea phidile (Geyer, 1837)
Memphis acidalia victoria (H. Druce, 1877)
Zaretis strigosus (Gmelin, [1790])
DANAINAE (4)
Aeria olena Weymer, 1875
Brevioleria aelia plisthenes (R.F. d'Almeida, 1958)
Danaus gilippus (Cramer, 1775)
Mechanitis polymnia casabranca Haensch, 1905
HELICONIINAE (9)
Actinote pellenea Hübner, [1821]
Agraulis vanillae maculosa (Stichel, [1908])
Dryas iulia alcionea (Cramer, 1779)
Eueides isabella dianasa (Hübner, [1806])
Euptoieta hegesia meridiania Stichel, 1938
Heliconius besckei (Ménétriés, 1857)
Heliconius erato phyllis (Fabricius, 1775)
Heliconius ethilla narcaea (Godart, 1819)
Philaethria wernickei (Röber, 1906)
LIMENITIDINAE (1)
Adelpha thoasa gerona (Hewitson, 1867)
NYMPHALINAE (8)
Anartia jatrophae jatrophae (Linnaeus, 1763)
Eresia lansdorfi (Godart, 1819)
Historis odius dious Lamas, 1995
Junonia evarete (Cramer, 1779)
Ortilia orthia (Hewitson, 1864)
Tegosa claudina (Eschscholtz, 1821)
Telenassa teletusa (Godart, [1824])
Vanessa myrinna (E. Doubleday, 1849)
SATYRINAE (29)
Caligo illioneus (Cramer, 1775)
Cissia eous (A. Butler, 1867)
Erichthodes narapa (Schaus, 1902)
Godartiana muscosa (A. Butler, 1870)
Hermeuptychia ca. *atalanta* (A. Butler, 1867)
Hermeuptychia gisella (Hayward, 1957)
Hermeuptychia maimoune (A. Butler, 1870)
Morpho anaxibia (Esper, [1801])
Morpho helenor ca. *mielkei* Blandin, 2007
Morpho epistrophus (Fabricius, 1796)
Moneuptychia itapeva Freitas, 2007
Moneuptychia wahlbergi Freitas, Barbosa, Siewert & Mielke, 2015
Nhambikuara cerradensis Freitas, Barbosa & Zacca, 2018
Opsiphanes invirae (Hübner, [1808])
Paryphthimoides sylvina (C. Felder & R. Felder, 1867)
Pharneuptychia ca. *innocentia* sp. 1
Pharneuptychia ca. *innocentia* sp. 2
Pharneuptychia ca. *innocentia* sp. 3
Pharneuptychia ca. *innocentia* sp. 4
Pharneuptychia phares (Godart, [1824])
Praepedaliodes landryi Pyrcz & Freitas, 2017
Stegosatyrus ocelloides (Schaus, 1902)
Taygetis laches Fabricius, 1793
Taygetis sp.
Yphthimoides affinis (A. Butler, 1867)
Yphthimoides cipoensis Freitas, 2004
Yphthimoides pacta (Weymer, 1911)
Yphthimoides patricia (Hayward, 1957)
Yphthimoides straminea (A. Butler, 1867)
PAPILIONIDAE (6)
PAPILIONINAE (6)
Heraclides thoas brasiliensis (Rothschild & Jordan, 1906)
Mimoides lysithous (Hübner, [1821])
Parides anchises foetterlei (Rothschild & Jordan, 1906)
Parides bunichus diodorus (Hopffer, 1865)
Protesilaus telesilaus (C. Felder & R. Felder, 1864)
Pterourus scamander grayi (Boisduval, 1836)
PIERIDAE (15)
COLIADINAE (11)
Anteos clorinde (Godart, [1824])
Anteos menippe (Hübner, [1818])
Eurema albula sinoe (Godart, 1819)
Eurema deva (E. Doubleday, 1847)

Eurema elathea flavescens (Chavannes, 1850)
Eurema phiale paula (Röber, 1909)
Leucidia elvina (Godart, 1819)
Phoebis argante (Fabricius, 1775)
Phoebis marcellina (Cramer, 1777)
Pyrisitia leuce (Boisduval, 1836)
Pyrisitia nise tenella (Boisduval, 1836)
DISMORPHIINAE (1)
Enantia clarissa (Weymer, 1895)
PIERINAE (3)
Glutophrissa drusilla (Cramer, 1777)
Hesperocharis paranensis Schaus, 1898
Melete lycimnia (Cramer, 1777)
RIODINIDAE (37)
NEMEOBIINAE (1)
Euselasia thucydides truncata Callaghan, 2001
RIODININAE (36)
Adelotypa asemna (Stichel, 1910)
Ancyluris colubra (Saunders, 1859)
Anteros formosus (Cramer, 1777)
Anteros lectabilis Stichel, 1909
Ariconias glaphyra (Westwood, 1851)
Aricoris almironensis (Schweizer & Kay, 1941)
Aricoris caracensis (Callaghan, 2001)
Aricoris tutana (Godart, [1824])
Aricoris sp. 1
Aricoris sp. 2
Baeotis johannae Sharpe, 1890
Calephelis brasiliensis McAlpine, 1971
Chalodeta theodora (C. Felder & R. Felder, 1862)
Detritivora gynaea (Godart, [1824])
Emesis diogenia Prittwitz, 1865
Emesis lupina melancholica Stichel, 1916
Juditha sp.
Lemonias stalachtioides (A. Butler, 1867)
Lyropteryx terpsichore Westwood, 1851
Melanis smithiae (Westwood, 1851)
Melanis xenia (Hewitson, [1853])
Parcella amarynthina (C. Felder & R. Felder, 1865)
Periplacis nitida (A. Butler, 1867)
Phaenochitonia sp.
Rhetus belphegor (Westwood, 1851)
Rhetus periander arthuriana (Sharpe, 1890)
Riodina lycisca (Hewitson, [1853])
*Sertania jaibensi*s (Callaghan & Soares, 2001)
Stalachtis phlegia phlegetontia (Perty, 1833)
Stichelia bocchoris (Hewitson, 1876)
Synargis axenus (Hewitson, 1876)
Synargis calyce (C. Felder & R. Felder, 1862)
Theope ca. *leucanthe* H. Bates, 1868
Theope pieridoides C. Felder & R. Felder, 1865
Zabuella castanea (Prittwitz, 1865)
Zabuella paucipuncta (Spitz, 1930)