Biota Neotropica 22(2): e20211320, 2022
www.scielo.br/bn

biotaneotropica
ISSN 1676-0611 (online edition)

Inventory

Checklist of Damselflies and Dragonflies (Odonata) from Acre state, and the first record of *Drepanoneura loutoni* von Ellenrieder & Garrison, 2008 for Brazil

Jair da Costa Miranda Filho[1], *Cristian Camilo Mendoza Penagos*[1,2]*, *Lenize Batista Calvão*[1,4], *Thiago Barros Miguel*[5], *Rafael Costa Bastos*[1,3], *Victor Rennan Santos Ferreira*[1,3], *Diego V. M. Lima*[6], *Lisandro J.S. Vieira*[6], *Leandro Schlemmer Brasil*[7] & *Leandro Juen*[1,2,3]

[1]*Instituto de Ciências Biológicas, Laboratório de Ecologia e Conservação, Rua Augusto Corrêa, n° 1, Guamá, CEP 66.075-110, Belém, PA, Brasil.*
[2]*Universidade Federal do Pará, Programa de Pós-graduação em Zoologia, Belém, PA, Brasil.*
[3]*Universidade Federal do Pará, Programa de Pós-graduação em Ecologia, Belém, PA, Brasil.*
[4]*Universidade Federal do Amapá, Programa de Pós-graduação em Ciências Ambientais, Macapá, AP, Brasil.*
[5]*Instituto Federal de Educação Ciências e Tecnologia de Mato Grosso, Barra do Garças MT, Brasil.*
[6]*Universidade Federal do Acre, Programa de Pós-Graduação em Ecologia e Gestão de Recursos Naturais, Rio Branco, AC, Brasil.*
[7]*Universidade Federal do Mato Grosso, Instituto de Ciências Biológicas e da Saúde, Avenida Universitária, n° 3.500, Parque Universitário, CEP 78690-000, Pontal Araguaia, MT Brasil.*

**Corresponding author: cristian.penagos@icb.ufpa.br*

MIRANDA FILHO, JC., MENDOZA-PENAGOS, C.C., CALVÃO, L.B., MIGUEL, T.B., BASTOS, R.C., FERREIRA, V.R.S., LIMA, D.V.M., VIEIRA, L.J.S., BRASIL, L.S., JUEN, L. **Checklist of Damselflies and Dragonflies (Odonata) from Acre state, and the first record of Drepanoneura loutoni von Ellenrieder & Garrison, 2008 for Brazil**. Biota Neotropica 22(2): e20211320. https://doi.org/10.1590/1676-0611-BN-2021-1320

Abstract: Here we present the first Odonata (Insecta) species list for the state of Acre, Northern Brazil, adding ecological aspects and notes on its taxonomy and conservation status. Regarding Odonata samplings, Acre is one of the least explored states in the northern region of Brazil and an area of geographic importance, as it is a transition between the Andean and Amazon regions. Collections were carried out in 35 streams, distributed in nine municipalities. We also supplemented our database from the review of secondary literature and data from biological collections. We recorded 140 species, distributed in 55 genera, of which 16 species are new records for the state, making Acre state the second in the number of recorded species in northern Brazil. Of the recorded species, 113 are classified within some threat category of the IUCN red list and 110 in the ICMBio national list. Analyzing the taxonomic information on each recorded species, knowledge of females and larvae is still very limited and, most of the time, only available to adult males. For the first time, the occurrence of *Drepanoneura loutoni* von Ellenrieder & Garrison (2008) is reported for Brazil, and we also present photos of its main morphological characters, with comments on its biology. Our study shows the importance of conducting biodiversity research in poorly studied areas; such as the state of Acre, and serves as a basis for future expeditions in the region.
Keywords: *List of distribution; Aquatic insects; Inventory; Anisoptera and Zygoptera.*

Checklist das Libélulas (Odonata) do estado do Acre, e o primeiro registro de *Drepanoneura loutoni* von Ellenrieder & Garrison, 2008 para o Brasil

Resumo: Apresentamos a primeira lista de espécies de Odonata (Insecta) para o estado do Acre no Brasil, adicionando aspectos ecológicos e notas sobre o seu estado de conservação. O Acre é um dos estados com o menor esforço de coleta da região Norte do Brasil e uma área de importância geográfica, pois é uma transição entre os Andes e a Amazônia. Foram realizadas coletas em 35 riachos, distribuídos em nove municípios e também complementados com informações de dados secundários de revisão na literatura e bases de dados de coleções biológicas. Registramos 140 espécies, distribuídas em 55 gêneros, das quais 16 espécies são novos registros para o estado, tornando-o o segundo em número de espécies na região Norte do Brasil. Das espécies registradas, 113 estão classificadas dentro de alguma categoria de ameaça da lista vermelha da IUCN e 110 na lista nacional do ICMBio. Analisando as informações do conhecimento das espécies, o conhecimento das fêmeas e larvas ainda muito limitado e na maioria das vezes disponíveis apenas para os machos adultos. Pela primeira vez é registrada a ocorrência da Drepanoneura loutoni von Ellenrieder & Garrison (2008) no Brasil, também apresentamos fotos das principais estruturas, com comentários sobre sua biologia. Nosso trabalho mostra a importância da realização de estudos de biodiversidade em áreas ainda pouco estudadas como a do estado do Acre e serve como base para futuras expedições na região.
Palavras-chave: *Lista de distribuição; Insetos aquáticos; Inventário; Anisoptera e Zygoptera.*

Introduction

Dragonflies and damselflies (order Odonata) constitute a group of charismatic insects, with vibrant colors and great flight capacity (Souza et al. 2007). Worldwide, there are more than 6,300 Odonata valid species, however, considering the great diversity that has yet to be described, estimates indicate that the real number could exceed 7,000 (Suhling et al. 2015, Bybee et al. 2021), due to the preservation of environmental conservation areas focused on these organisms (Bede 2015). The Neotropical region alone contributes approximately 1,700 of the described species (Olaya 2019). In this region, South America stands out for its high species richness, althought much of its territorial extension has not yet been satisfactorily sampled (Kalkman 2008, Araújo et al. 2020). This is an even more evident problem in countries with a large territorial extension such as Peru, Colombia or Brazil (Tognelli et al. 2016).

In Brazil, 901 species of dragonflies are recorded (Pinto 2021), a number that reflects the growing number of studies with this target group in the last decade (Miguel et al. 2017). Despite this increase, only 29% of the Brazilian territory was surveyed so far, being a large part of these collections carried out in regions with more human and financial resources, such as the Southern, Southeastern and Midwestern regions (De Marco & Vianna 2005, Calvão et al. 2016, Rodrigues & Roque 2017). In this sense, these studies, in addition to being insufficient, have a heterogeneous spatial distribution with a recent and slow increase in poorly sampled areas and which access is difficult, such as the Northern, (Koroiva et al. 2020a, Garcia Junior et al. 2021) and Northeastern regions (Santos et al. 2021, Koroiva et al. 2021).

Acre is one of the nine states that compose the Brazilian Legal Amazon (Padrão et al. 2016), a region with large knowledge gaps, especially those related to which species exist and where they are distributed (Linnean and Wallacean gaps) (Hortal et al. 2015). So far, there are only studies by Raimundo et al. (2003), Oliveira (2017) and Garcia Junior et al. (2022) dealing with Odonata species for the state, none of which are specifically directed to the state of Acre in order to list records. However, research carried out in the vicinities of Acre (e.g., state of Amazonas) provides an idea of the diversity potential existing in the region. For example, Paulson (1985) cites the Manu National Park (Perú) as one of the most biodiverse regions for dragonflies on the planet, with 838 species recorded, corresponding to approximately 13% of the global Odonatofauna (reinforced by Venable 1996). Additionally, in Northern Brazil, 334 species have recorded the state of Amazonas alone, which neighbors the state of Acre (Koroiva et al. 2020b). Furthermore, carrying out studies in border regions such as Acre-Pando-Madre de Dios (Brazil, Bolivia and Peru) are of great importance for taking conservation actions for the forest fragments and transboundary water resources (Souza et al. 2013, Acre 2010).

Regarding this scenario, the objectives of our study were: i) to provide the first Odonata species list for the state of Acre; and ii) to provide information on the type of environment in which the species were collected and their level of degradation. Additionally, we recorded for the first time to Brazil the specie *Dreopanoneura loutoni* von Ellenrieder & Garrison, 2008, providing some taxonomic notes and images for the terminalia of both male and female, as well habitat characteristics. We believe that these results can mitigate some of the Linnean gap still present in this region, and consequently provide basic biological information that can be used in further studies for the Amazon forest.

Material and Methods

1. Study Area

The Acre state is located in the extreme west of the Northern region of Brazil, in the Western Amazon (Brasil 1968). The territorial extension of the state comprises an area of 164,173,431 km², representing 4% of the Brazilian Amazon and 1.9% of the total territory of Brazil (Figure 1) (Acre 2010, IBGE 2021). The state of Acre has international borders with Peru and Bolivia, and national borders with the states of Amazonas and Rondônia (Acre 2010).

The prevailing climate is the “Am” tropical type (according to Köppen’s classification), described as hot and humid, with high temperatures, high levels of rainfall, and high relative humidity (Peel et al. 2007). The Acre soils, of sedimentary origin, have a predominantly dense rainforest cover (SEMA 2021), characterized by floristic heterogeneity, which constitutes great economic value for the state (Acre 2010). Regarding the relief, the state of Acre has a stable platform that descends smoothly at 300 m on international borders to just over 110 m on the limits with the state of Amazonas. At the western end is the highest point in the state, where the relief changes with the Serra do Divisor, a branch of the Serra Peruana de Contamana, with maximum altitude of 734 m. The hydrography is quite complex, being formed by the hydrographic basins of the rivers Juruá and Purus, tributaries on the right bank of the Solimões river (Acre 2010).

The Acre state falls under the Amazon deforestation arc, where approximately 11% of its territory was already deforested due to the advance of agricultural frontiers (Aguiar et al. 2016). Furthermore, that region is characterized by extractive activities such as rubber and Brazil nut extraction (Ângelo et al. 2013, Martins 2020). However, activities such as the reforestation of Teak (*Tectona grandis* L. F.), fire control programs in the region (large contributors to the ecological imbalance of forests), and monitoring activities (Raimundo et al. 2003, Terra 2017) are preserving native species in the state.

1.1. Places Sampled on Excursions

The sampling was made in the municipalities of Assis Brasil, Brasiléia, Porto Acre, Rio Branco, Sena Madureira, and Senador Guiomard (TABLE 1). The sampled municipalities correspond to approximately 22% of the total area of the state (IBGE 2021). We selected streams that represent a wide gradient of forest cover at the landscape level, and different land uses, from areas altered by agriculture and pasture, to preserved areas located within conservation units. There are two extractive reserves among the sampled areas: RESEX Chico Mendes and RESEX Cazumbá-Iracema, both conservation units meant for sustainable use of natural resources. Data from the RESEX Alto Juruá, taken from the secondary database (Raimundo et al. 2003), were also used. The territorial extension of RESEX Chico Mendes is 970,570 acres, while in Cazumbá-Iracema the territory is 750,795 acres (Acre 2010). Even located within conservation units, these areas are under strong anthropogenic pressure, especially from activities with high environmental impact, such as the conversion of forest into pasture for cattle raising (Fantini & Crisóstomo 2009, Mascarenhas et al. 2018). All collections were made with permission from the Biodiversity Authorization and Information System – SISBio (License number: 11841-4).

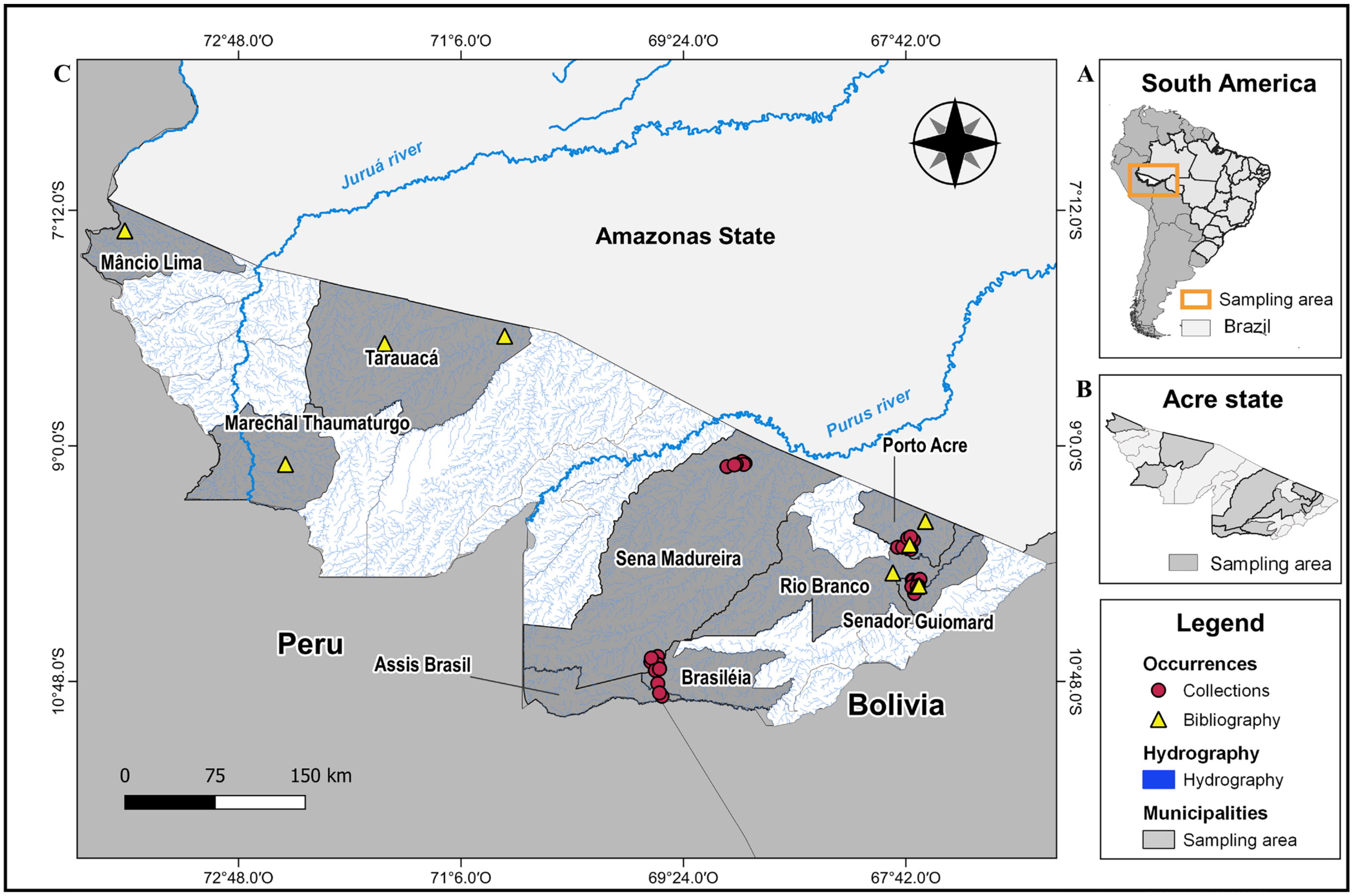

Figure 1. A: South America, with emphasis on the political division of Brazil and territorial extension of the Acre state; B: Map of Acre state; C: Close-up of Acre state, highlighting municipalities with Odonata records.

The Habitat Integrity Index (HII) (Nessimian et al. 2008) was used to relate the integrity of sampled sites to the presence of species. This index has been shown to be an effective metric to explain the distribution of aquatic insect communities, mainly Odonata (Brasil et al. 2021). The index consists of 12 items, which assess characteristics of the banks and the water body. The result varies between 0 (degraded) and 1 (preserved). To categorize the streams, we adopted the criterion proposed by Oliveira-Junior (2015), where environments are considered degraded when values are between $0.15 < HII < 0.49$; intermediate if $0.5 < HII < 0.74$; and preserved if $HII > 0.75$. This classification criterion has been used successfully in other research (Monteiro-Junior et al. 2015, Oliveira-Junior 2015, Oliveira-Junior & Juen 2019) (Table 1).

2. *Preparation of Species List*

The preparation of the species list was made using information from primary data (expeditions and field data collection in 35 streams) and secondary data (from literature and databases). To prepare the list, this information was gathered together with information from the Odonata collection of the Laboratory of Ecology and Conservation (LABECO) of the Federal University of Pará (UFPA), Belém (for more details on the database, access Brasil et al. 2021).

2.1. Collection of Specimens

Adult odonates were collected from 35 small streams (1st to 3rd order according to the Strahler's classification (1957)). A transect of 150 meters was established in each stream, and then subdivided into ten longitudinal sections of 15 m each, named "A" to "K" in the upstream direction. In addition, specimens were collected more specifically on the banks of the stream, with the aid of an entomological net and with a sampling effort of one hour along each transect, with an average of six minutes on each longitudinal section (Cezário et al. 2021). Sampling was always carried out on sunny days between 11:00 and 14:00, which is the ideal weather conditions for the activity of most Odonata species (Monteiro-Júnior et al. 2015, Oliveira-Junior & Juen 2019). The collected specimens were packaged and preserved according to the protocol by Lencioni (2006). For the taxonomic identification of the collected specimens, specific keys such as those by Lencioni (2005, 2006, 2013), and Garrison et al. (2006) were used. In addition, comparisons were made with specimens already identified and deposited in the collection of LABECO - UFPA, and, when necessary, specialists were consulted, such as Frederico Lencioni e Diogo Vilela.

2.2. Search in Literature and Databases

Additional secondary data were obtained from the following databases: SpeciesLink (http://splink.Cria.org.br/), and Brazilian Taxonomic Catalog of Fauna (http://fauna.jbrj.gov.br;Brazilian FaunaTaxonomic Catalog), making a filter for information on species in the state of Acre. Data was also gathered from specimen description studies, mainly seeking information from biology or natural history and where they occur in Brazil (Garrison et al. 2006, Lencioni 2005, 2006).

Table 1. Primary data with sampling points in the hydrographic basins of the Acre, Iguiri and Caeté rivers, Acre state, Brazil.

Point (SU)	Point Code	Municipality	Coordinates	Elevation (masl)	HII	Condition
1	AC01	Senador Guiomard	10º7'37.2"S 67º38'6"W	170	0.417	Degraded
2	AC02	Senador Guiomard	10º1'30"S 67º39'7.2"W	187	0.428	Degraded
3	AC03	Senador Guiomard	10º1'48"S 67º38'38.4"W	188	0.352	Degraded
4	AC04	Senador Guiomard	10º4'19.2"S 67º36'54"W	200	0.970	Preserved
5	AC05	Senador Guiomard	10º4'15.6"S 67º37'22.8"W	201	0.920	Preserved
6	AC06	Rio Branco	10º1'51.6"S 67º36'32.4"W	195	0.954	Preserved
7	AC07	Rio Branco	10º1'8.4"S 67º35'34.8"W	196	0.954	Preserved
8	AC08	Senador Guiomard	10º4'33.6"S 67º39'18"W	204	0.609	Intermediate
9	AC09	Senador Guiomard	10º4'8.4"S 67º36'18"W	202	0.870	Preserved
10	AC10	Porto Acre	9º47'24"S 67º39'46.8"W	182	0.664	Intermediate
11	AC11	Porto Acre	9º43'15.6"S 67º38'31.2"W	171	0.496	Intermediate
12	AC13	Porto Acre	9º46'8.4"S 67º40'33.6"W	166	0.596	Intermediate
13	AC14	Rio Branco	9º46'26.4"S 67º45'50.4"W	197	0.440	Degraded
14	AC15	Rio Branco	9º46'26.4"S 67º43'30"W	195	0.822	Preserved
15	AC16	Porto Acre	9º42'21.6"S 67º41'13.2"W	180	0.739	Intermediate
16	CZ01	Sena Madureira	9º7'57.972"S 68º55'49.548"W	173	0.819	Preserved
17	CZ02	Sena Madureira	9º7'49.584"S 68º56'15.612"W	169	0.764	Preserved
18	CZ03	Sena Madureira	9º7'51.996"S 68º56'27.096"W	165	0.764	Preserved
19	CZ04	Sena Madureira	9º7'11.964"S 68º57'9.936"W	147	0.613	Intermediate
20	CZ05	Sena Madureira	9º9'28.987"S 69º4'4.66"W	160	0.590	Intermediate
21	CZ06	Sena Madureira	9º8'5.496"S 68º56'57.876"W	146	0.494	Intermediate
22	CZ07	Sena Madureira	9º7'11.964"S 68º57'9.936"W	144	0.619	Intermediate
23	CZ08	Sena Madureira	9º8'28.248"S 68º56'23.028"W	189	0.875	Preserved
24	CZ09	Sena Madureira	9º8'20.033"S 68º59'48.934"W	185	0.671	Intermediate
25	CZ10	Sena Madureira	9º8'42.292"S 69º0'44.968"W	170	0.688	Intermediate
26	CM01	Brasiléia	10º48'54.472"S 69º35'43.897"W	288	0.585	Intermediate
27	CM02	Assis Brasil	10º54'41.936"S 69º33'52.088"W	273	0.606	Intermediate
28	CM03	Assis Brasil	10º53'13.546"S 69º35'0.172"W	268	0.336	Degraded
29	CM04	Brasiléia	10º41'59.741"S 69º34'59.596"W	273	0.543	Intermediate
30	CM05	Sena Madureira	9°09'29.0"S 69°04'04.7"W	266	0.460	Degraded
31	CM06	Brasiléia	10º40'7.622"S 69º35'46.32"W	302	0.425	Degraded
32	CM07	Sena Madureira	9°07'12.0"S 68°57'09.9"W	266	0.467	Degraded
33	CM08	Sena Madureira	9°08'28.3"S 68°56'23.0"W	307	0.664	Intermediate
34	CM09	Brasiléia	10º42'55.033"S 69º36'52.722"W	286	0.293	Degraded
35	CM10	Brasiléia	10º42'14.4"S 69º34'58.8"W	282	0.194	Degraded

Captions. SU=Sampling Unit, AC=Acre. CM=Chico Mendes. CZ=Cazumbá-Iracema. Non-sequential numbers were extracted from the literature (Table 2).

With the incorporation of secondary data, we added 12 more collection points in six municipalities, taken from the literature describing the corresponding species, three exclusively for literature data and another three already added from LABECO collection tours, data from two recently published articles were also incorporated, Oliveira (2017) as point L14 and Garcia Junior et al. (2022) as point L13 (TABLE 2). The literature search was based on the Web of Science and Scielo databases, using data from previously published studies that record odonates in the region of the Acre state. The published data are also search results on Google Scholar (http://scholar.google.com), we use the terms: "Odonata and Acre and Brasil" for more general literature, and we add specific terms to confirm information missing (e.g. "larva and female" or "taxonomy and description"). There have been species description works since the end of the 18th century and the beginning of the 19th century, with specimens of odonatas collected in the region of the state. Searches were carried out in May 2021. Additional searches were completed in February 2022. Collection information was considered: species name, occurrence, collection date, collector name and location (city and state), in addition to additional information about the altitude level of each point, habitat (municipality and additional information such as vegetation type or name of stream or lake, when available), number of individuals collected and number of males, females and larvae described.

https://doi.org/10.1590/1676-0611-BN-2021-1320

Table 2. Information obtained from secondary data. L= Secondary data based on literature.

Point Code	Point (SU)	Municipality	Coodinates	Elevation (masl)
L1	36	Porto Acre	9º 41' 42"S 67º 39' 50.4"W	206
L2	37	Senador Guiomard	10º 4' 19.56"S 67º 36' 53.64"W	200
L3	38	Brasiléia	10º42'14.328"S 69º34'59.592"W	208
L4	39	Marechal Tramaturgo	9° 08' 23.0"S 72° 26' 28"W	295
L5	40	Tarauacá	8º 13' 0" S 71° 41' 0" W	240
L6	41	Porto Acre	9º 34′ 35″ S 67° 33′ 3″ W	164
L7	42	Mâncio Lima	7º 21' 23" S 73° 40' 4" W	197
L8	43	Senador Guiomard	10° 4' 20"S 67° 36' 53"W	200
L9	44	Tarauacá	8° 09' 39" S 70° 45' 57" W	172
L10	45	Porto Acre	09° 45' 19"S 67° 40' 18"W	189
L11	46	Rio Branco	09° 58' 13"S 67° 48' 00"W	135
L12	47	Senador Guiomard	10° 03' 60"S 67° 35' 59"W	191
L13	48	--	--	--
L14	49	--	--	--

Caption. L= Literature.

3. Statistical Analysis

To assess the efficiency of the sampling effort, we generated collector curves with rarefaction (interpolation) using the first-order Jackknife estimator, which allows us to evaluate collection efficiency and produce the collector curve. Using this method, we estimated the number of species per sampled transect. As a result, the observed richness with the average of Mao Tau Sobs was obtained and Jackknife (Burnham & Chazdon 1978; Burnham & Overton 1979), the most accurate and least biased estimator compared to other extrapolation methods (Palmer, 1990). All analyzes were performed in the R software (RCoreTeam 2019) using the "vegan" (Oksanen et al. 2005), and "BiodiversityR" (Kindt & Coe 2005) packages (Supplementary Material, Table S1).

4. Taxonomic Notes

Drepanoneura loutoni von Ellenrieder & Garrison, 2008 was recorded for the first time in Brazil. *D. loutoni* were collected in the two extractive reserves (RESEX). The specimens were photographed using a Leica M205 a stereomicroscope equipped with a Leica DFC 450 camera. Subsequently, we processed the image in the in a free image editor. Morphological terminology for *D. loutoni* follows von Ellenrieder & Garrison (2008). All the measurements are in millimeters (mm). Abbreviations: Ce, cercu; Pa, paraproct; Ep, epiprocto; Tru, truncated.

Results

Altogether, 140 species were recorded (Table 3; Figure 2, 3 and 4), being 57 from primary data and 108 from secondary records, with 19 of these records already in our collection data. The number of estimated species was 38 ± 0.652 (mean ± SD). When we analyzed the efficiency of the collection effort (average observed richness/average estimated richness), we obtained a value of 73%. These results show that the efficiency collection for the study was enough to sample the existing biodiversity in the region. A similar result was observed in the collector curve, where there was a tendency to stabilization in its final part (Figure 5; Supplementary material, Table S1).

The total number of Odonata genera thus far recorded for the state is 55, distributed in nine families. The suborder Zygoptera was the most representative, with six families, namely: Calopterygidae (two genera, six species), Coenagrionidae (17 genera, 54 species), Heteragrionidae (one genus, three species), Polythoridae (two genera, four species), Dicteriadidae (one genus, one species), Perilestidae (two genera, two species). In its turn, the suborder Anisoptera comprises three families: Libellulidae (23 genera, 62 species), Gomphidae (two genera, two species), and Aeshnidae (five genera, five species).

Of the 140 recorded species, 98 have described females. When considering the larval stages, only 56 species have their larvae described. In our study, the material identified to genus level was not considered, as it could represent an underestimation of the diversity presented here. However, we would like to record the existence of specimens of the following genera: *Dythemis* Hagen, 1861, *Elasmothemis* Westfall, 1988, *Oligoclada* Karsch, 1890, and *Heteragrion* Selys, 1862 that present different structures. More detailed analyzes are being carried out to determine if these taxa represent species new to science or new records for Brazil.

Knowledge concerning the conservation status of dragonflies in Acre state is still incipient. However, based on the Red List of Endangered Species of the Livro Vermelho da Fauna Brasileira Ameaçada de Extinção (ICMBio 2018) and the International Union for Conservation of Nature (IUCN, https://www.iucnredlist.org), of the 140 listed species, 113 were evaluated, but we emphasize that none is threatened with extinction (EX), in critical danger (CR) or any threat category (TABLE 3). In the IUCN list, most species (103) are in the Least Concern (LC) category, 10 species have insufficient data (DD), while 27 species have not yet been evaluated (NE); on the ICMBio list, 105 species are listed as least concerning (LC), five have insufficient data (DD) and 30 have not yet been evaluated.

The registration data for Brazil come from the taxonomic keys of Lencioni (2005, 2006) and Garrison (2006), as well as for described females and larvae, being complemented, when necessary, with data from the "Brazilian Taxonomic Catalog of Fauna" and articles describing the species, that contains their collection points as well as geographic coordinates data.

Table 3. List of recorded species in the primary and secondary databases.

Species	Primary data	Secundary data	Classification IUCN	Classification ICMBio	Female described		Larva described		Ocurrence in Brazil	Reference
Zygoptera					**Yes**	**No**	**Yes**	**No**		
Coenagrionidae										
Hetaerina laesa Hagen in Selys, 1853	4, 7 e 10.	36, 48.	NE	LC	X			X	PA. RO. MT. AC	Garcia Junior et al. 2022
Hetaerina rosea Selys, 1853*	1 e 3.	--	LC	LC	X		X		RO. MG. RJ. SP. RS. MT. BH.	Lencioni 2005
Hetaerina sanguinea Selys, 1853	--	39, 48.	LC	LC	X			X	AM. AC	Garcia Junior et al. 2022
Mnesarete aenea (Selys, 1853)	5	48	NE	LC	X			X	PA. RO. AC.	Garcia Junior et al. 2022
Mnesarete cupraea (Selys, 1853)	1, 4, 5, 7, 9, 10, 16, 19, 25, 26, 27, 28, 29, 30 e 34.	39, 48.	NE	LC		X		X	AC. RO. PA. MA. MT.	Garcia Junior et al. 2022
Mnesarete loutoni Garrison, 2006*	17 e 21.	--	NE	LC	X			X	AM.	Lencioni 2005
Coenagrionidae										
Acanthagrion apicale Selys, 1876	5	36, 48.	LC	NE	X		X		PA. RO. AC.	Garcia Junior et al. 2022
Acanthagrion ascendens Calvert, 1909*	22, 32 e 33.	--	LC	NE	X		X		MT. SP.	Lencioni 2006
Acanthagrion floridense Fraser, 1946	2	--	LC	NE	X		X		RO. AC.	Lozano et al. 2017
Acanthagrion gracile (Rambur, 1842)	26	37, 48.	LC	NE	X			X	BH. MT. RJ. SP. RS. AC.	Garcia Junior et al. 2022
Acanthagrion obsoletum (Foster, 1914)	1, 2, 3, 8, 26, 29 e 33.	37	LC	NE	X			X	AC.	Lencioni 2006
Acanthagrion peruvianum Leonard, 1977	2	--	LC	DD	X			X	RO. AC.	Lozano et al. 2017
Acanthagrion temporale Selys, 1876*	--	36	LC	LC	X			X	RO. BH. MT. MG. SP.	Lencioni 2006
Amazoneura juruaensis Machado, 2004	--	42, 48.	DD	NE		X		X	AC.	Garcia Junior et al. 2022, Machado 2004.
Argia cf. Adamsi Calvert, 1902	18, 20 e 24.	--	NE	NE	X		X		AC.	De Marmels 2007
Argia collata Selys, 1865	1, 2, 6, 7, 9, 16, 17, 18, 21 e 22.	--	LC	NE	X			X	PA. AC. RO.	Garrison & Ellenrieder 2018
Argia dives Förster, 1914*	29, 31 e 35	--	LC	NE	X			X	MT.	Lencioni 2006
Argia euphorbia Fraser, 1946	--	39, 48.	LC	LC		X		X	AM. RO. AC.	Garcia Junior et al. 2022
Argia fumigata Hagen in Selys, 1865*	27, 28, 31 e 33.	--	LC	LC		X		X	AM. RO. MT.	Garrison & Ellenrieder 2015
Argia indicatrix Calvert, 1902*	2	--	NE	LC	X			X	AM.	Lencioni 2006
Argia infumata Selys, 1865	5 e 6.	48	NE	LC	X			X	PA. AM. RO. AC.	Garcia Junior et al. 2022

continue...

...continue

Species	Primary data	Secundary data	Classification IUCN	Classification ICMBio	Female described		Larva described		Ocurrence in Brazil	Reference
Zygoptera					**Yes**	**No**	**Yes**	**No**		
Coenagrionidae										
Argia loutoni Garrison & von Ellenrieder, 2015	--	41	LC	NE	X			X	AM. AC.	Garrison & Ellenrieder 2015
Argia oculata Hagen in Selys, 1865*	2, 31, 32 e 33	--	NE	LC	X		X		AM. MT.	TORRES-PACHÓN et al. 2017, Garrison & Ellenrieder 2015
Argia tennesseni Garrison & von Ellenrieder, 2018	--	40	LC	NE	X			X	AC.	Garrison & Ellenrieder 2018
Argia thespis Hagen in Selys, 1865*	10, 12 e 15	36	NE	NE	X			X	AM. BH.	Lencioni 2006
Drepanoneura janirae von Ellenrieder & Garrison, 2008*	16, 17, 18, 21, 22, 23 e 24.	--	NE	DD		X		X	RO.	Von Ellenrieder & Garrison 2008
Drepanoneura loutoni von Ellenrieder & Garrison, 2015**	19, 21, 25, 27, 31, 33, 34 e 35	--	LC	NE	X			X	AC.	Von Ellenrieder & Garrison 2008
Epipleoneura tariana Machado, 1985	--	48	LC	LC		X		X	AM. AC.	Pessacq 2014, Garcia Junior et al. 2022
Epipleoneura venezuelensis Rácenis, 1955*	1, 2, 4, 5, 6, 9, 10, 14, 22, 27, 28, 29, 30 e 31.	--	LC	LC	X			X	DF. GO. MG. MT. PA. RJ. SP. ES.	Pessacq 2014
Ischnura capreolus (Hagen, 1861)	--	48	LC	LC	X		X		PA. PE. BA. MT. ES. RJ. SP. RS. AC.	Garcia Junior et al. 2022
Mecistogaster amalia (Burmeister, 1839)	--	48	LC	LC	X		X		RJ. SP. AC	Garcia Junior et al. 2022
Mecistogaster buckleyi McLachlan, 1881*	--	39	LC	NE		X		X	AM.	Lencioni 2006
Mecistogaster jocaste Hagen, 1869	--	39	LC	DD	X			X	AC.	Lencioni 2006
Mecistogaster linearis (Fabricius, 1777)*	--	39	LC	LC	X		X		AM. RO. PA. MS. AM. SP.	Lencioni 2006
Metaleptobasis falcifera von Ellenrieder, 2013	--	43, 48.	LC	NE	X			X	AC.	Von Ellenrieder 2013
Metaleptobasis inermis von Ellenrieder, 2013	--	48	DD	NE		X		X	PA. AC.	Von Ellenrieder 2013
Metaleptobasis minteri Daigle, 2003	--	44, 48.	DD	NE	X			X	AC.	Von Ellenrieder 2013
Microstigma anomalum Rambur, 1842	--	48	LC	LC	X			X	AM. PA. AC.	Garcia Junior et al. 2022
Microstigma rotundatum Selys, 1860	--	39, 48.	NE	LC	X			X	AC.	Garcia Junior et al. 2022
Neoneura bilinearis Selys, 1860	--	39, 48.	LC	LC	X			X	PA. ES. SP	Garcia Junior et al. 2022
Neoneura denticulata Williamson, 1917	--	48	LC	LC	X			X	AM. RO. RR. PA. AC.	Garcia Junior et al. 2022

continue...

...continue

Species	Primary data	Secundary data	Classification IUCN	Classification ICMBio	Female described		Larva described		Ocurrence in Brazil	Reference
Zygoptera Coenagrionidaea					**Yes**	**No**	**Yes**	**No**		
Neoneura rubriventris Selys, 1860*	2	--	LC	LC	X			X	RR. PA. RO. RS.	Lencioni 2006
Neoneura rufithorax Selys, 1886	--	48	LC	LC	X			X	AM. AC.	Garcia Junior et al. 2022
Philogenia marinasilva Machado, 2010	--	42	LC	NE		X		X	AC.	Machado 2010a
Phoenicagrion flammeum (Selys, 1876)	--	36, 48.	LC	LC	X			X	PA. AM. AC. TO. AM. RO. PE. MT.	Garcia Junior et al. 2022
Platystigma humaita Machado & Soldati, 2017	--	45	DD	NE		X		X	AC.	Machado & Lacerda 2017
Platystigma jocaste (Hagen, 1869)	--	48	LC	NE	X			X	AC.	Garcia Junior et al. 2022
Platystigma minimum Machado & Soldati, 2017	--	46	DD	NE		X		X	AC.	Machado & Lacerda 2017
Platystigma quadratum Machado & Soldati, 2017	--	47	DD	NE		X		X	AC.	Machado & Lacerda 2017
Protoneura scintilla Gloyd, 1939*	2, 21, 22, 27 e 32.	--	LC	LC	X			X	RO.	Lencioni 2006
Protoneura tenuis Selys, 1860	1, 4, 5, 6, 9, 16 e 17.	36 e 39	LC	LC	X			X	PA. RO. AC.	Garcia Junior et al. 2022
Protoneura woytkowskii Gloyd, 1939	16, 18, 22, 26 e 31.	--	NE	NE	X			X	AC.	Lencioni 2006
Psaironeura bifurcata (Sjöstedt, 1918)	--	48	LC	LC	X			X	AM. PA. AC.	Garcia Junior et al. 2022
Psaironeura tenuissima (Selys, 1886)*	8, 17, 18, 19, 22 e 24.	--	NE	LC	X			X	AM. PA. RO.	Lencioni 2006
Telebasis carmesina Calvert, 1909	--	48	LC	LC	X			X	MT. MG. SP. AC.	Garrison 2009, Garcia Junior et al. 2022
Telebasis corbeti Garrison, 2009	--	43	NE	NE		X		X	AC.	Garrison 2009, Machado 2010b, Garcia Junior et al. 2022
Telebasis griffinii (Martin, 1896)	16, 17, 22, 26 e 31.	48	LC	LC	X		X		PA. AM. AC. MS. SP. RJ. MS.	Garrison 2009, Guilhermo-Ferreira 2013, Garcia Junior et al. 2022
Telebasis obsoleta (Selys, 1876)	--	44, 48.	LC	LC		X	X		PA. AM. AC. PR. MT. MS.	Garrison 2009, Lozano et al. 2017, Garcia Junior et al. 2022
Telebasis rubricauda Bick & Bick, 1995	--	48	LC	DD	X			X	RO. AC.	Garrison 2009, Garcia Junior et al. 2022

continue...

...continue

Species	Primary data	Secundary data	Classification IUCN	Classification ICMBio	Female described		Larva described		Ocurrence in Brazil	Reference
Zygoptera					Yes	No	Yes	No		
Coenagrionidae										
Tigriagrion aurantinigrum Calvert, 1909	1 e 3.	36, 48.	LC	LC	X			X	MT. MG. SP. AC.	Garcia Junior et al. 2022
Dicteriadidae										
Heliocharis amazona Selys, 1853	16 e 35	39, 48.	NE	LC	X		X		GO. MT. MG. SP. AC.	Garcia Junior et al. 2022
Heteragrionidae										
Heteragrion bariai De Marmels, 1989	4, 6, 7, 9, 10, 13, 16, 17, 18, 21, 23, 26, 27, 33 e 34.	36, 48.	NE	LC	X			X	RO. AC.	Garcia Junior et al. 2022
Heteragrion bickorum Daigle, 2005	16, 18, 19, 21, 22, 23, 24 e 25.	--	LC	NE	X			X	AC.	Lencioni 2005
Heteragrion cf. Majus Selys, 1886	17 e 21.	--	LC	NE		X	X		AC.	Lencioni 2005
Perilestidae										
Perilestes kahli Williamson & Williamson, 1924*	21, 22 e 29, 31 e 32	--	LC	LC	X			X	RO. PA.	Kennedy 1937
Perissolestes paprzyckii Kennedy, 1941	--	48	DD	DD	X			X	AC. AM.	Garcia Junior et al. 2022
Polythoridae										
Chalcopteryx rutilans (Rambur, 1842)	7	48	LC	LC	X		X		AM. PA. RO. GO. MT. AC.	Garcia Junior et al. 2022
Polythore manua Bick and Bick 1990	--	39, 48.	LC	NE	X			X	AC. AM.	Garcia Junior et al. 2022
Polythore picta (Rambur, 1842)	--	48	LC	LC	X			X	AM. AC	Garcia Junior et al. 2022
Polythore vittata (Selys, 1869)	--	39, 48.	NE	LC	X			X	AC.	Garcia Junior et al. 2022
Anisoptera										
Aeshnidae										
Coryphaeschna adnexa (Hagen 1861)	--	39, 48.	LC	LC	X		X		AC.	Garcia Junior et al. 2022
Gynacantha interioris Williamson, 1923	--	48	LC	LC	X			X	AC.	Williamson 1932, Garcia Junior et al. 2022
Neuraeschna calverti Kimmins, 1951	--	39, 48.	LC	LC		X		X	AC.	Garcia Junior et al. 2022
Remartinia luteipennis (Burmeister, 1839)	--	48	LC	LC	X		X		AC. RJ.	Carvalho 1992, Garcia Junior et al. 2022
Staurophlebia reticulata (Burmeister, 1839)	--	39, 48.	LC	LC	X		X		AC.	Garcia Junior et al. 2022
Gomphidae										
Agriogomphus cf. Sylvicola Selys, 1869*	19	--	NE	LC	X		X		AM.	Garrison et al. 2006
Zonophora calippus Selys, 1869	--	48	LC	LC	X		X		AC	Belle 1966, Garcia Junior et al. 2022

continue...

...continue

Species	Primary data	Secundary data	Classification IUCN	Classification ICMBio	Female described		Larva described		Ocurrence in Brazil	Reference
Anisoptera					**Yes**	**No**	**Yes**	**No**		
Libellulidae										
Argyrothemis argentea Ris, 1911*	5 e 17.	--	LC	LC	X		X		AM. PA. RO. PA. AM. MT.	Garrison et al. 2006
Brachymesia furcata (Hagen, 1861)	--	48	LC	LC		X	X		AC.	Garcia Junior et al. 2022
Brachymesia herbida (Gundlach, 1889)	--	36, 48.	LC	LC		X	X		AM. PA. MT. MS. SP. RJ. AC.	Garcia Junior et al. 2022
Dasythemis esmeralda Ris, 1910*	--	36	LC	LC	X			X	MT.	Garrison et al. 2006
Diastatops emilia Montgomery, 1940*	1 e 3.	--	DD	LC		X		X	PA.	Garrison et al. 2006
Diastatops obscura (Fabricius, 1775)	--	36, 48.	LC	LC	X		X		AC. AM. AP. BA. ES. GO. MA. MG. MS. MT. PA. PB. PE. PR. RJ. RO. RR. SP. TO.	Garcia Junior et al. 2022
Dythemis sterilis Hagen, 1861	11	48	NE	LC	X		X		AC.	Garcia Junior et al. 2022
Elasmothemis cannacrioides (Calvert, 1906)*	--	36	NE	LC	X		X		MG.	Garrison et al. 2006
Erythemis atalla (Selys in Sagra, 1857)	--	49	LC	LC	X		X		MG. AC.	Oliveira 2017, Bhukal 2017
Erythemis credula (Hagen, 1861)	--	36, 48.	NE	LC		X	X		AC.	Garcia Junior et al. 2022
Erythemis haematogastra (Burmeister, 1839)	--	36, 48.	LC	LC	X			X	AC. AM. AP. BA. ES. GO. MA. MG. MS. MT. PA. PB. PE. SP	Garcia Junior et al. 2022
Erythemis mithroides (Brauer, 1900)	--	36, 48.	LC	LC	X		X		AC.	Garcia Junior et al. 2022
Erythemis peruviana (Rambur, 1842)	--	46	LC	LC	X		X		PA. AM. AC. AP. RO. TO. CE. BA. AL. PI. SE. PE. PB. RN. MA. ES. MG. SP. RJ. RS. PR. SC.	Garrison et al. 2006
Erythemis vesiculosa (Fabricius, 1775)	--	36, 48.	LC	LC	X		X		AM. RJ. AC.	Garcia Junior et al. 2022
Erythrodiplax amazonica Sjöstedt, 1918*	--	39	LC	LC		X	X		AM.	Garrison et al. 2006
Erythrodiplax anatoidea Borror, 1942	--	49	LC	LC		X		X	AC.	Oliveira, 2017
Erythrodiplax attenuata (Kirby, 1889)	--	48	LC	LC	X			X	RO. AC.	Garcia Junior et al. 2022
Erythrodiplax basalis (Kirby, 1897)	12, 15 e 33.	48	LC	LC	X		X		AC. AM. GO. MA. MS. MT. PA. PE.	Kirby 1897, Garcia Junior et al. 2022
Erythrodiplax basalis avittata Borror, 1942*	--	36	NE	NE	X			X	MS. RJ. SP.	Garrison et al. 2006

continue...

...continue

Species	Primary data	Secundary data	Classification IUCN	Classification ICMBio	Female described		Larva described		Ocurrence in Brazil	Reference
Anisoptera					Yes	No	Yes	No		
Libellulidae										
Erythrodiplax branconensis Sjöstedt, 1929	--	48	DD	LC		X		X	AC.	Garcia Junior et al. 2022
Erythrodiplax clitella Borror, 1942	--	36, 48.	LC	LC	X			X	RS. AC.	Garcia Junior et al. 2022
Erythrodiplax fusca (Rambur, 1842)	26	39, 48.	LC	LC	X		X		AC. AM. BA. ES. PA. PE. RJ. SP. GO. MA. MG. MS. MT. PR. RO. RR.	Garcia Junior et al. 2022
Erythrodiplax latimaculata Ris, 1911	--	48	LC	LC	X		X		AC.	Garcia Junior et al. 2022
Erythrodiplax paraguayensis (Förster, 1905)	--	48	DD	LC		X	X		AC.	Muzón & Garré 2005, Garcia Junior et al. 2022
Erythrodiplax umbrata (Linnaeus, 1758)	26	36, 48.	LC	LC	X		X		AC. AM. AP. BA. ES. GO. PA. PE.	Carvalho 1991, Garcia Junior et al. 2022
Erythrodiplax unimaculata (De Geer, 1773)*	--	36	LC	LC		X		X	AP. MT	Garrison et al. 2006
Fylgia amazonica Kirby, 1889	12 e 13	39, 48.	LC	LC	X			X	PA. AC.	Garcia Junior et al. 2022
Idiataphe cubensis (Scudder, 1866)*	--	36	LC	LC		X	X		AM.	Garrison et al. 2006
Miathyria marcella (Selys *in* Sagra, 1857)*	15 e 16.	36	LC	LC	X		X		RJ. PA. RS. SP.	Garrison et al. 2006
Miathyria simplex (Rambur, 1842)	--	36, 48.	NE	LC		X	X		AC.	Garcia Junior et al. 2022
Micrathyria artemis Ris, 1911	--	39, 48.	LC	LC	X		X		AM. AP. BA. ES. GO. MG. MS. MT. PA. RJ. RO. SP. AC.	Garcia Junior et al. 2022
Micrathyria atra (Martin, 1897)	--	39	LC	LC		X	X		AC.	Garrison et al. 2006
Micrathyria ocellata (Martin, 1897)	--	39, 48.	LC	LC		X	X		AC. RS. ES.	Garcia Junior et al. 2022
Micrathyria pseudeximia Westfall, 1992*	--	46	NE	LC		X		X	AM, GO, ES, MA, PA, PR, MG, MS , MT, RJ. RO..	Garrison et al. 2006
Nephepeltia flavifrons (Karsch, 1889)	--	48	LC	LC		X		X	AC.	Garcia Junior et al. 2022
Nephepeltia phryne (Perty, 1834)*	26	--	LC	LC	X		X		BA. SC. RO. PI	Garrison et al. 2006
Oligoclada monosticha Borror, 1981	--	48	LC	LC	X			X	PA. AC.	Garcia Junior et al. 2022
Oligoclada walkeri Geijskes, 1931*	16 e 22	--	LC	LC	X			X	RO. PA. MT.	Borror 1931
Orthemis biolleyi Calvert, 1906	--	36, 48.	LC	LC		X		X	RO. AC.	Garcia Junior et al. 2022
Orthemis cultriformis Calvert, 1899	5	36, 48	NE	LC	X		X		GO. MS. AC.	Garcia Junior et al. 2022
Orthemis discolor (Burmeister, 1839)*	29	--	LC	LC		X		X	RO.	Garrison et al. 2006

continue...

...continue

Species	Primary data	Secundary data	Classification IUCN	Classification ICMBio	Female described		Larva described		Ocurrence in Brazil	Reference
Anisoptera					**Yes**	**No**	**Yes**	**No**		
Libellulidae										
Orthemis schmidti Buchholz, 1950	2 e 5	--	NE	LC		X	X		PA. AM. AC. AP. RO. TO. CE. BA. AL. PI. SE. PE. PB. RN. MA. ES. MG. SP. RJ. RS. PR. SC.	Costa & Santos 2009
Pantala flavescens (Fabricius, 1798)	--	36, 48.	LC	LC	X		X		PA. AM. BA. PE. MT. ES. MG. SP. RJ. RS. AC.	Garcia Junior et al. 2022
Perithemis cf. icteroptera (Selys *in* Sagra, 1857)	19, 20, 22, 25 e 32	--	LC	LC	X		X		AC. MG. MS. RS.	Ris 1930
Perithemis cornelia Ris, 1910	--	39, 48.	LC	LC	X			X	PA. AM. RR. RO. AP TO. CE. BA. AL. PI. SE. PE. PB. RN. MA. MT. GO. MS. DF. EP. MG. SP. RJ. RS. PR. SC.	Ris 1930, Garcia Junior et al. 2022
Perithemis electra Ris, 1930	--	39, 48.	LC	LC	X		X		AC. MS.	Ris 1930, Garcia Junior et al. 2022
Perithemis lais (Perty, 1834)*	19	36	LC	LC	X		X		PA. AM. RO. RR. PE. MA. MT. MS. ES. MG. RJ SP.	Ris 1930, Costa 2005
Perithemis tenera (Say, 1840)	19	--	LC	LC	X		X		MT. MG. RJ. SC.	Ris 1930, Santos 1973
Perithemis parzefalli Hoffmann, 1991	--	39	LC	NE		X		X	AC.	Garrison et al. 2006
Perithemis rubita Dunkle, 1982	--	49	LC	NE	X		X		AC.	Dunkle 1982, Oliveira 2017.
Perithemis thais Kirby, 1889	28, 31 e 33.	39, 48.	LC	LC	X		X		AM. AP. ES. PA. MS. MT. RJ. RO. SP. AC.	Ris 1930, Garcia Junior et al. 2022
Rhodopygia cardinalis (Erichson *in* Schomburgk, 1848)	14	36, 48.	LC	LC	X			X	AM. MT. MG. PA. AC.	Garcia Junior et al. 2022
Tauriphila argo (Hagen, 1869)	--	48	LC	LC		X	X		AC.	Costa 1994, Garcia Junior et al. 2022
Tramea binotata (Rambur, 1842)	--	48	LC	LC	X		X		AC. RO.	De Marmels 1994, Tennessen 2017, Garcia Junior et al. 2022

continue...

...continue

Species	Primary data	Secundary data	Classification IUCN	Classification ICMBio	Female described		Larva described		Ocurrence in Brazil	Reference
Anisoptera					**Yes**	**No**	**Yes**	**No**		
Libellulidae										
Tramea cophysa Hagen, 1867	--	36	LC	LC	X		X		PB. MT. MS. ES. MG. SP. RJ. RS. PR. SC. AC.	De Marmels 1982, Costa 2000, Garcia Junior et al. 2022
Tramea rustica De Marmels & Rácenis, 1982	--	48	LC	LC	X			X	AM. RO. AC. MT.	De Marmels 1982, Garcia Junior et al. 2022
Uracis fastigiata (Burmeister, 1839)	--	39, 48	NE	LC		X		X	AM. AC. AP. RR. RO. TO PA. MA. PB. BA. MT.	Garcia Junior et al. 2022
Uracis imbuta (Burmeister, 1839)	5	39, 48.	LC	LC		X		X	AC.	Garcia Junior et al. 2022
Uracis infumata (Rambur, 1842)	--	39, 48.	LC	LC		X		X	AC. RO, PA, MT. AM.	Garcia Junior et al. 2022
Uracis siemensi Kirby, 1897	--	48	LC	LC	X			X	AC. PA.	Garcia Junior et al. 2022
Zenithoptera fasciata (Linnaeus, 1758)	--	36, 48.	LC	LC		X		X	PA. AM. AC. AM. RO. MA. MT. GO	Garcia Junior et al. 2022
Zenithoptera lanei Santos, 1941	1	48	LC	LC		X	X		PA. AM. AC. AP. RO. TO. CE. BA. AL. PI. SE. PE. PB. RN. MA. ES. MG. SP. RJ. RS. PR. SC. SC.	Garcia Junior et al. 2022

Caption. *New records for Acre state; **New records for Brazil; -- No data. Acre - AC; Alagoas - AL; Amapá - AP; Amazonas - AM; Bahia - BA; Ceará - CE; Distrito Federal - DF; Espírito Santo - ES; Goiás - GO; Maranhão - MA; Mato Grosso - MT; Mato Grosso do Sul - MS; Minas Gerais - MG; Pará - PA; Paraíba - PB; Paraná - PR; Pernambuco - PE; Piauí - PI; Roraima - RR; Rondônia - RO; Rio de Janeiro - RJ; Rio Grande do Norte - RN; Rio Grande do Sul - RS; Santa Catarina - SC; São Paulo - SP; Sergipe - SE; Tocantins - TO.

The habitat integrity of the sampled streams ranged from 0.194 to 0.970, suggesting a high environmental heterogeneity along with the sampled points. From the scores generated by the HII, ten points were classified as preserved, 15 had intermediate integrity and another ten were categorized as degraded (TABLE 1). The municipality of Sena Madureira was the one with the highest preservation index and the greatest collection effort due to its vast territorial extension (23,759,518 ha), which corresponds to 14% of the state of Acre. On the other hand, Brasiléia, with only 2% of the territory of Acre (3,928,174 ha), presents high degradation rates. In this location, five points were sampled, two of them being classified as intermediate and three as degraded (Table 1).

1. *Taxonomic Notes*

The specimens examined correspond to the morphological characteristics mentioned by the authors, which are: truncated paraprocts, cercus in lateral and laterodorsal views are truncated, with a wider base that tapers towards its distal apex, ending in a blunt tip (Figure 6). In addition, the characteristic yellow band can be seen below the ventral margin of the antehumeral band (Figure 7). According to von Ellenrieder & Garisson (2008), specimens of *D. loutoni* are associated with lotic environments, being generally found perched in riparian vegetation or performing active flights close to the water surface, making the individuals difficult to be captured. In our collections, these characteristics were evidenced. Our sampling localities for *D. loutoni* correspond to first-order streams with a well-established band of riparian vegetation, light entering at various points along the bed, with HII score of 0.497. When there was no direct sunlight, individuals were observed perched on the tips of branches and leaves at a maximum height of 1.5 m. Under strong light conditions, specimens were observed flying close to the water surface on the stream bank.

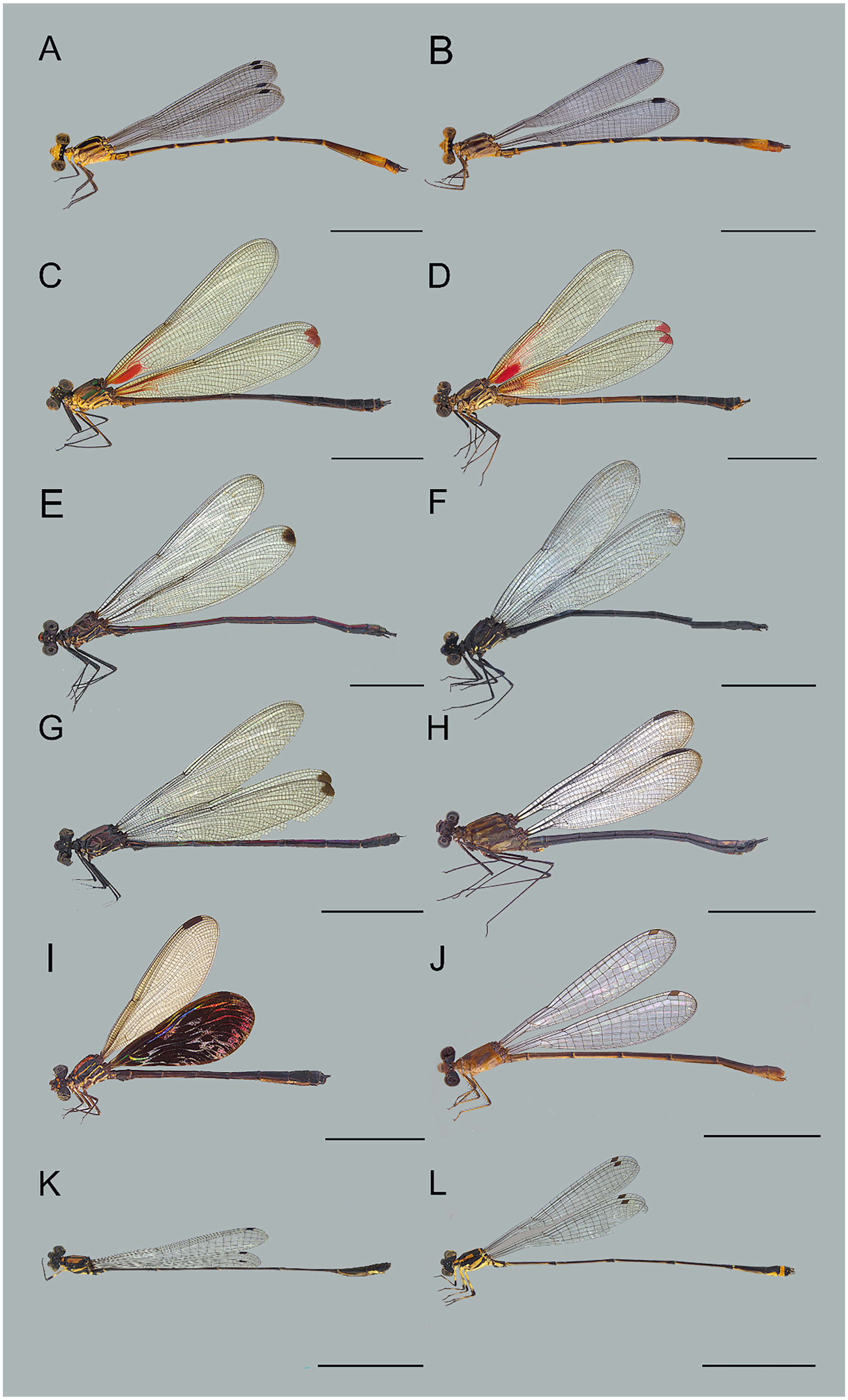

Figure 2. Some of the species presented in this study. Family Heteragrionidae: A) *Heteragrion bariai* De Marmels, 1989, B) *H. bickorum* Daigle, 2005; Family Calopterygidae: C) *Hetaerina laesa* Hagen *in* Selys, 1853, D) *H. rosea* Selys, 1853, E) *Mnesarete cupraea* (Selys, 1853), F) *M. loutoni* Garrison, 2006, G) *M. aenea* (Selys, 1853); Family Dicteriadidae: H) *Heliocharis amazona* Selys, 1853; Family Polythoridae: I) *Chalcopteryx rutilans* Ris, 1914; Family Coenagrionidae: J) *Phoenicagrion* sp., K) *Protoneuera tenuis* Selys, 1860, L) *P. woytkowskii* Gloyd, 1939.

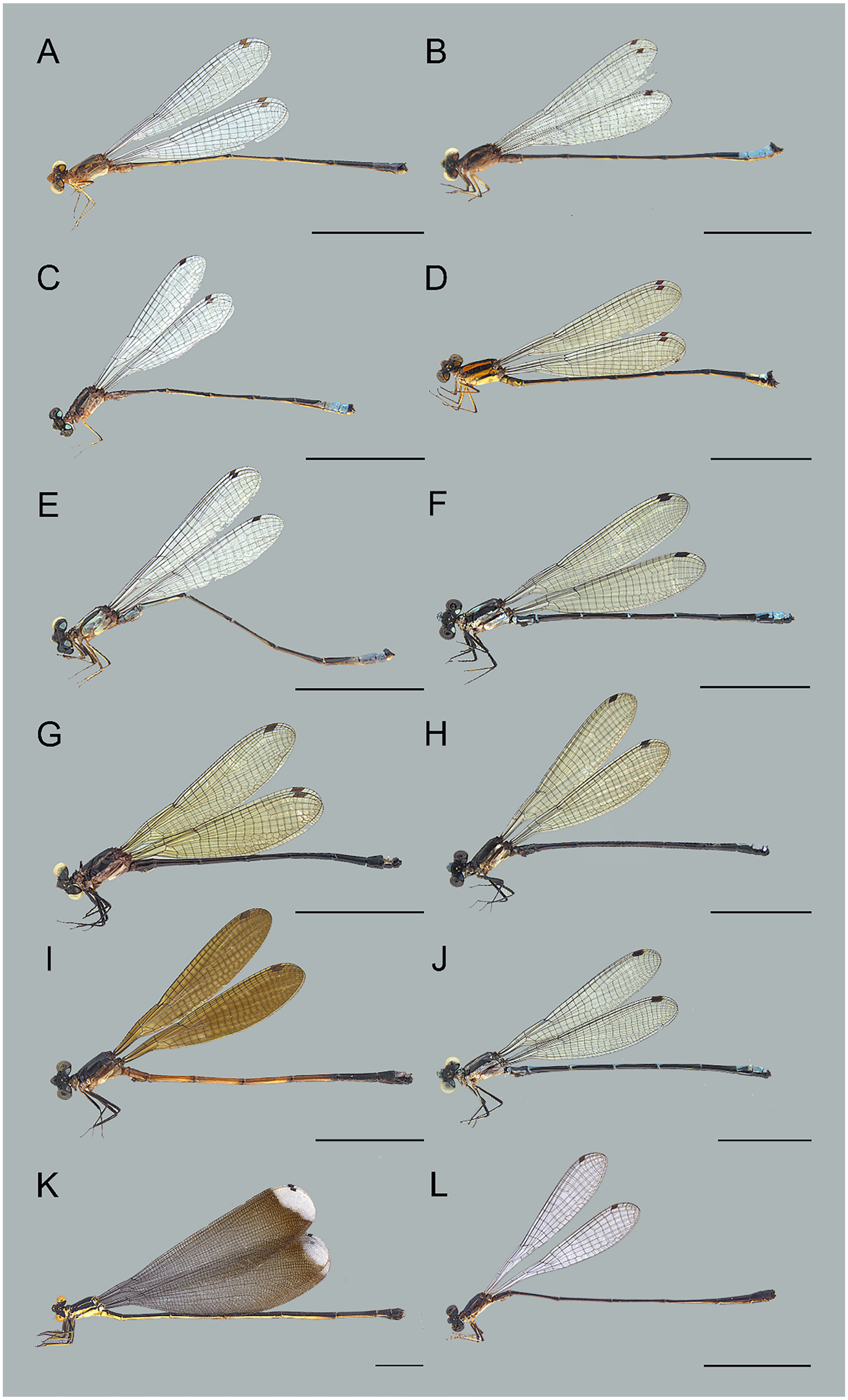

Figure 3. Some of the species presented in this study. Family Coenagrionidae: A) *Acanthagrion obsoletum* (Förster, 1914), B) *A. ascendens* Calvert, 1909, C) *A. gracile* (Rambur, 1842), D) *A. apicale* Selys, 1876, E) *A. floridense* Fraser, 1946, F) *Argia fumigata* Hagen in Selys, 1865, G) *A. indicatrix* Calvert, 1902, H) *A. collata* Selys, 1865, I) *A. infumata* Selys, 1865, J) *A. oculata* Hagen in Selys, 1865, K) *Microstigma sp.*, L) *Epipleoneura venezuelensis* Rácenis, 1955. All images in 10 mm scale.

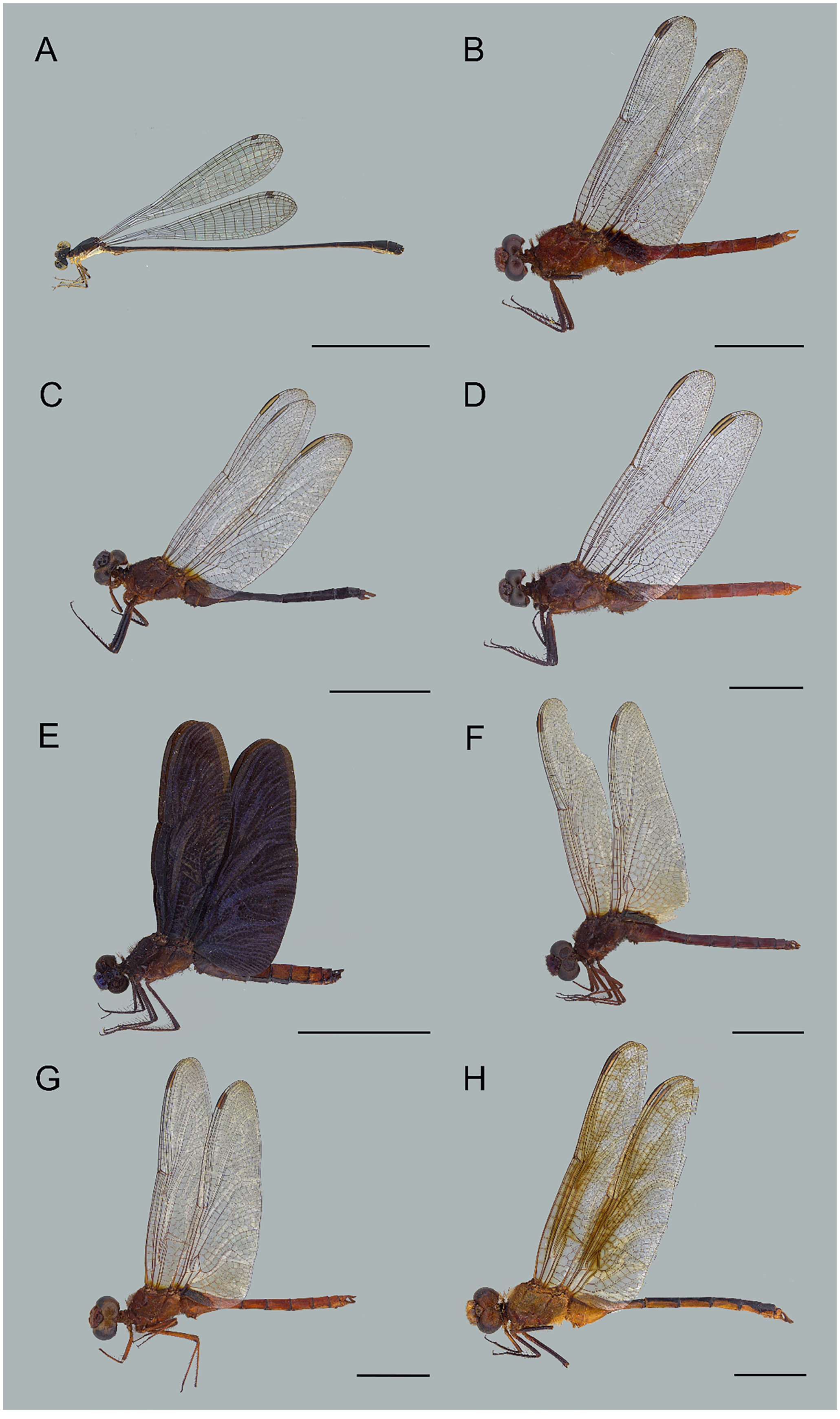

Figure 4. Some of the species presented in this study. Family Coenagrionidae: A) *Drepanoneura janirae* von Ellenrieder & Garrison, 2008; Family Libellulidae: B) *Erythemis credula* (Hagen, 1861), C) *E. mithroides* (Brauer, 1900), D) *Dasythemis esmeralda* Ris, 1910, E) *Diastatops obscura* (Fabricius, 1775), F) *Dythemis sterilis* Hagen, 1861; G) *Elasmothemis cannacrioides* (Calvert, 1906); H) *Brachymesia herbida* (Gundlach, 1889). All images in 1 cm scale.

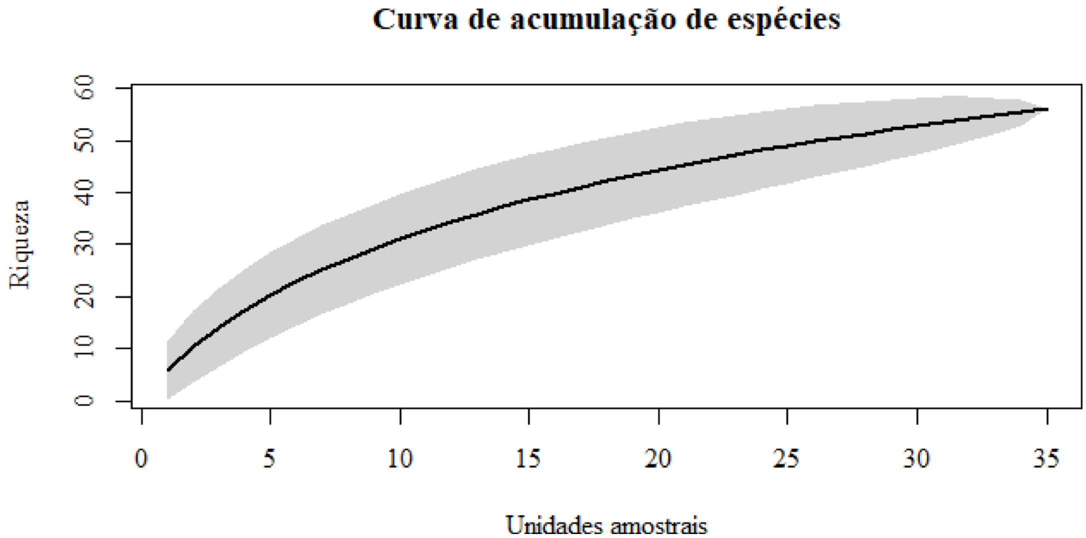

Figure 5. Species accumulation curve, representing the relation between species and sampled areas. The line represents the average calculated value of the collected species at the 35 sampling points in Acre state, Brazil. The lighter margins indicate their respective confidence intervals (95%).

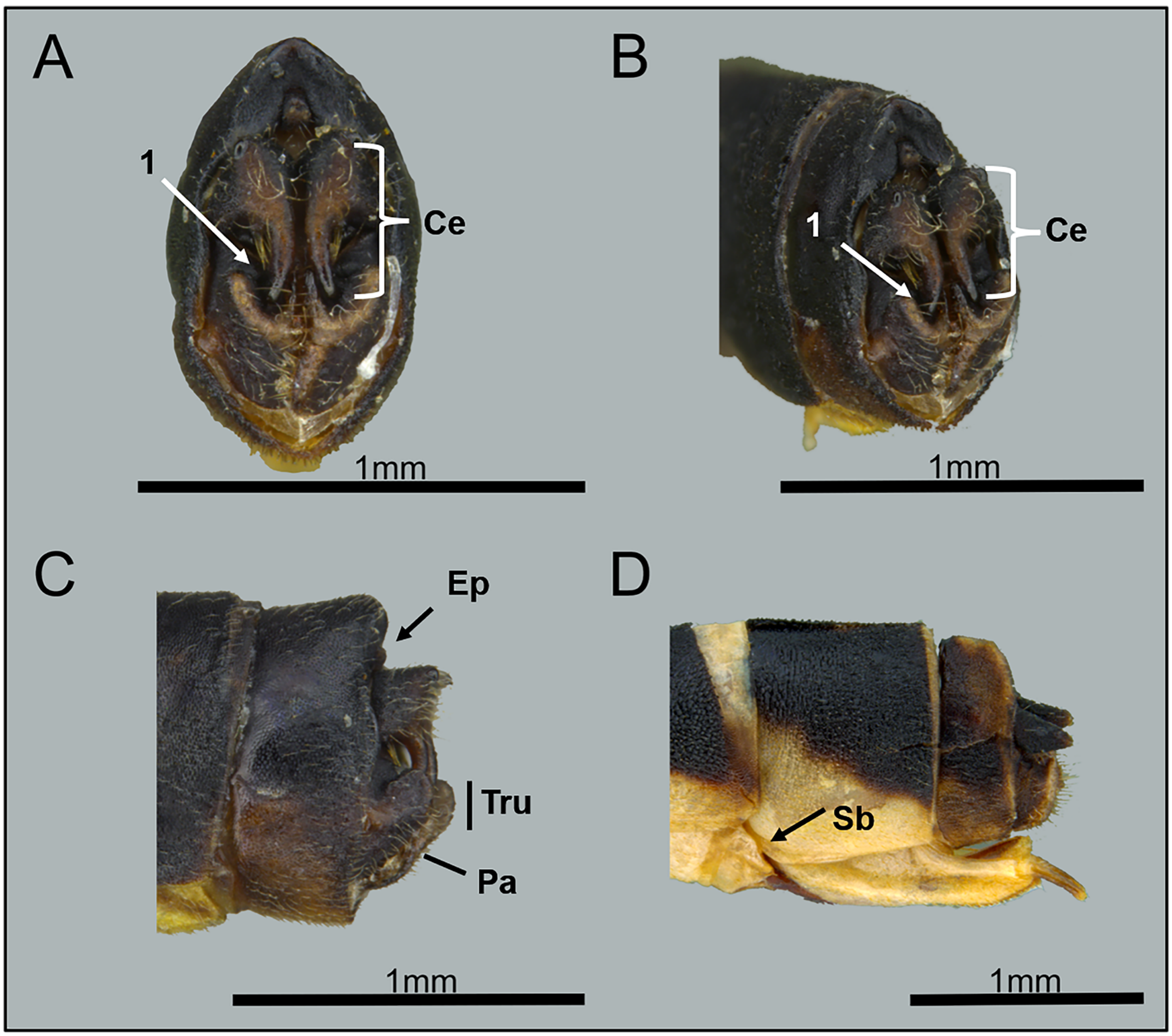

Figure 6. Male diagnostic structures of *Drepanoneura loutoni* von Ellenrieder & Garrison, 2008 (A, B and C) where A) cercus in frontal view; B) dorsolateral view; C) lateral view; D) Female ovipositor in lateral view; 1= Tapered tip of cercus; 2= ratio of ventro-apical curvature to base of cercus; Ep= epiproct; tru= truncated; pa= paraproct; sb= sub basal plate.

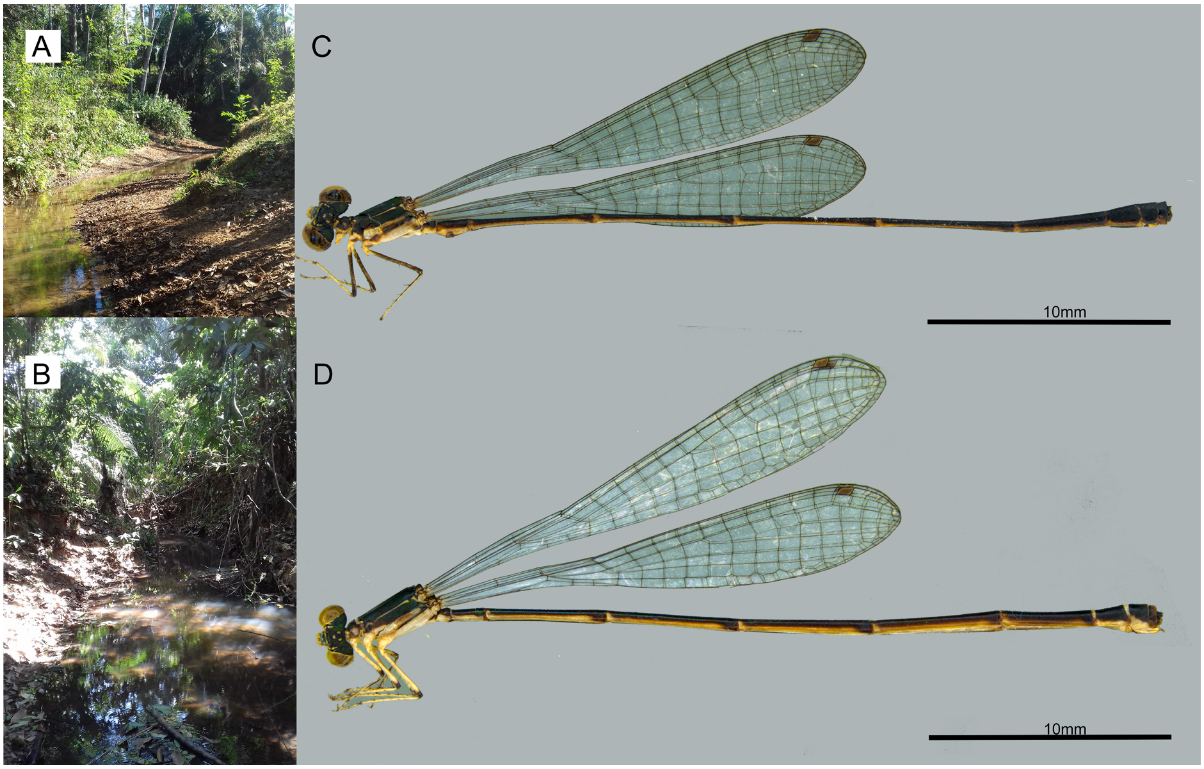

Figure 7. A) and B) habitat/specimens collection site of *Drepanoneura loutoni* von Ellenrieder & Garrison, 2008; C) male *D. loutoni*; D) female *D. loutoni*.

Discussion

In total, 140 species were recorded for the Acre state, becoming the fifth second the greatest diversity of Odonata in the Northern region, only behind Amazonas (n = 364), Pará (n = 310), Mato Grosso (n = 285) and Rondonia (n = 206) (García-Júnior et al. 2022). Following, we have the states of Amapá with 119 (Garcia Junior et al. 2022) and Roraima with 82 species (Garcia-Junior et al. 2022). However, considering that the information gathered in our study represents only a portion of the Acre state, we cannot rule out the possibility that this number could be even higher. Therefore, the need to carry out complementary samplings in other places in Acre is evident, as well as in more marginal points on the border with Amazonas and Perú. This is more evident in the center and northern portions of the state, where there are only a few records from the literature for the municipalities of Marechal Thaumaturgo (code number 39), Taraucá (code number 40) and Mâncio Lima (code number 42).

Our sampling effort was efficient but still shows a large gap for the Odonata knowledge in Acre. All information and occurrence records presented in this study come from nine municipalities in Acre, which correspond to approximately 22% of the total extension of the state, where the environmental protection units are the most representative in the study. As reported by Koroiva et al. (2020b), little information is found in the literature and in the databases, being Acre one of the most poorly explored states of Brazil. In this context, this study is the first compendium on the Odonatofauna for the state. Thus, this checklist represented a great effort and the first step towards trying to synthesize the state of knowledge of dragonflies for this region.

Recently, Garcia-Junior et al. (2022) reported the total number of species (n=82) for the state of Acre. However, they recorded from bibliographic research and did not inform the coordinates of the locations where the species were recorded, which significantly limits the use of this information. In our study, we increase the total number of Odonata species for the Acre state, based on information from field and literature, increasing the number to 140 species. In addition, we provide additional information on the localities where each species was collected and information related to the category of threat and knowledge about females and larvae. This type of information is essential as it allows more accurate assessments of the threats that species face, ensuring better strategies for their conservation (IUCN 2022). Our sampling effort was efficient but still shows a large gap for the Odonata knowledge in Acre.

As a result, the species *Drepanoneura loutoni* is reported for the first time in Brazil, being collected in the municipalities of Sena Madureira and Assis Brasil in eight streams. The occurrence of this species was expected because it is a species that has a distribution in the department of Madre de Dios, in Peru, which borders Brazil (Ellenrieder & Garrison 2008). This species has a strong connection with first and second order streams, in environments with dense vegetation cover. The genus *Drepanoneura* is known to occur along rivers and streams within forests, occupying large allopatric distributions from southern Panama through the foothills of the Andes Mountain range in Colombia, Ecuador, and Peru (Ellenrieder & Garrison 2008), and we found *D. loutoni* in a similar environment in Acre state. However, except for this basic occurrence information, *D. loutoni* has still large gap in its knowledge, as the larval stages are still undescribed, and little is known about its autoecological aspects.

Our results also show that many species still do not have descriptions of larvae and/or females, which hampers the advance of the taxonomic knowledge of the group. Therefore, in addition to taxonomic improvement, information regarding basic biology is of great importance. For instance, the distribution or status of populations is essential for us to advance and further integrate studies with Odonata, and effectively contribute to the assessment of endangered species such as the List of Threatened Species of ICMBio (2018), and IUCN (https://www.iucnredlist.org).

Our results show a high environmental heterogeneity (HII 0.194 - 0.970) within the sampled points, most of which are located within conservation units. However, Acre is within the deforestation arc, where a wide range of anthropogenic activities that generate changes in land use exists (Aguiar et al. 2016). Furthermore, in the Amazonian context, there are considerable evidence showing how odonates are affected by the loss of environmental integrity caused by land use modifications (Calvão et al., 2016, Oliveira-Junior & Juen 2019, Brasil et al. 2020). Thus, these results can indicate that Odonata communities are suffering strong pressures in the region. Therefore, we consider it necessary to expand the sampling efforts within a gradient of ecological conditions (from heavily impacted to pristine environments) likewise, the implementation of biomonitoring programs.

The information derived from our samplings will be of great importance in assessing the status of Odonata diversity in the Acre state, helping to identify threats and conservation strategies to be developed in the future. This study was carried out almost predominantly in the eastern zone of Acre, where the heaviest anthropogenic pressure in that state is located. The western region of the state still contain large areas of vegetation cover with many different phytophysiognomies such as campinaranas, indigenous lands (geographically more rugged), and with three types of water (clear, white and black). This entire arrangement of geophysical characteristics has a high potential for endemism and establishment of species with greater environmental demand.

Finally, this study highlights the importance of sampling efforts in poorly explored regions such as Acre state, making a significant contribution to the knowledge of the Neotropical odonatofauna and to one of the most biodiverse regions such as the Amazon biome.

Supplementary Material

The following online material is available for this article:

Table S1 - Richness estimate performed for each of the sampled points

Acknowledgments

We are grateful to the Federal University of Acre (UFAC) and Ichthyology Lab (Ictiolab) for logistical support in the surveys; to Federal University of Pará (UFPA) Ecology and Conservation Lab (LABECO) for collaboration in identifying the specimens and data analyses. This work was supported by the National Council for Scientific and Technological Development (CNPq) (process: 428961/2018-5) through the project "Diminishing Linnean and Wallacean gaps in aquatic biota in the Amazon"; by National Program for Academic Cooperation in the Amazon – PROCAD Amazon (process: 88887.200518/2018-00), through the project "Effect of land use and land cover on biodiversity and ecosystem functions in the South-Western Amazon"; and by Coordination for the Improvement of Higher Education Personnel (CAPES; 88881.145918/2017-01) through project "Climate Adaptation and Conservation of Brazilian Biodiversity Based on Regional Climate Models". We thank Laura Santacruz for her help in the preparation of the map. Finally, we are grateful to the Federal Institute of Acre (IFAC) for their support in field activities and the scholarship to the main author, through CAPES. L.J. are grateful to CNPq for his productivity grant to (304710/2019-9). C.M.P. are grateful to the CNPq for granting a doctoral scholarship (process: 141113/2020-0). This manuscript is the result of the scientific initiation of the first author, J. C. M. F., who received a grant from CNPq (process: 136770/2021-5). L.B.C. thanks CNPq for granting her a scholarship (process 154761/2018-4), and CAPES: PROCAD-AM (88887.512256/2020-00 and 88887.600197/2021-00). TB thanks to the Mato Grosso Federal Institute of Scientific and Technological Education (IFMT) for granting a license to conduct this research.

Associate Editor

Gustavo Graciolli

Author Contributions

Jair da Costa Miranda Filho: Substantial contribution in the concept and design of the study, Contribution to data collection, Contribution to data analysis and interpretation, Contribution to manuscript preparation, Contribution to critical revision, adding intelectual contente.

Cristian Camilo Mendoza Penagos: Substantial contribution in the concept and design of the study; Contribution to data collection; Contribution to data analysis and interpretation; Contribution to manuscript preparation; Contribution to critical revision, adding intelectual contente.

Lenize Batista Calvão: Substantial contribution in the concept and design of the study; Contribution to data analysis and interpretation; Contribution to manuscript preparation; Contribution to critical revision, adding intelectual content.

Leandro Schlemmer Brasil: Contribution to data collection; Contribution to manuscript preparation; Contribution to critical revision, adding intelectual content. He participated assiduously in field collections.

Thiago Barros Miguel: Contribution to data collection; Contribution to critical revision, adding intelectual content. He participated assiduously in field collections.

Rafael Costa Bastos: Contribution to data collection; Contribution to manuscript preparation; Contribution to critical revision, adding intelectual content. He participated assiduously in field collections.

Victor Rennan Santos Ferreira: Contribution to data collection; Contribution to manuscript preparation; Contribution to critical revision, adding intelectual content. He participated assiduously in field collections.

Diego V. M. Lima: Contribution to data collection; Contribution to manuscript preparation; Contribution to critical revision, adding intelectual content. He participated assiduously in field collections.

Lisandro J. S. Vieira: Contribution to data collection; Contribution to manuscript preparation; Contribution to critical revision, adding intelectual content. He participated assiduously in field collections.

Leandro Juen: Substantial contribution in the concept and design of the study; Contribution to data collection; Contribution to data analysis and interpretation; Contribution to manuscript preparation; Contribution to critical revision, adding intelectual content.

Conflicts of Interest

The authors declare that there is no conflict of interest related to the publication of this manuscript.

Ethics

The authors agree with the guidelines established by the ethics committees and their respective research institutions and being aware of scientific ethical commitments.

Data availability

The data are already included in the SISBIO platform (link https://www.icmbio.gov.br/ran/o-que-fazemos/sisbio.html) and are already being used for the reassessment of endangered Odonata species of Brazil.

References

ACRE, Governo do Estado. 2010. Zoneamento Ecológico-Econômico do Estado do Acre, Fase II (Escala 1:250.000): Documento Síntese. Rio Branco: SEMA, 2, 356.

AGUIAR, S., SANTOS, I.S., ARÊDES, N. & SILVA, S. 2016. Redes-Bioma: Informação e comunicação para ação sociopolítica em eco regiões. Ambient. soc., 19(3), 233–252.

ANGELO, H., POMPERMAYER, R.S., ALMEIDA, A.N. & MOREIRA, J.M.A.P. 2013. O custo social do desmatamento da Amazônia brasileira: o caso da castanha-do-brasil (*Bertholletia excelsa*). Cienc. Florestal. 23 (1), 183-191.

ARAÚJO, M.F.A., DE MARCO JR., P., JUEN, L. & TÔRRES, L.M. 2020. Vulnerability of *Phyllocycla* species (Odonata: Gomphidae) to current and Planned Anthropic Activities by the Brazilian Government. Neotrop. Entomol., 49, 24-32.

BEDE, L.C., MACHADO, A.B.M, PIPER, W., & SOUZA, M.M. 2015. Odonata of the Serra de São José – Brazil's first Wildlife Reserve aimed at the conservation of dragonflies. Notulae odonatologicae 8(5) 117-155.

BELLE, J. 1966. Additional notes on some dragon-flies of the genus *Zonophora*. Stud. on the Fauna of Suriname and other Guyanas, 8(1), 61-64.

BHUKAL, R. 2017. First Record of the Dragonfly *Erythemis attala* (Selys in Sagra, 1857) (Odonata: Libellulida) for Trinidad, West Indies. Living World, Journal of the Trinidad and Tobago Field Naturalists' Club, 52-53.

BORROR, D.J. 1931. The genus *Oligoclada* (Odonata). Misc. Publ. Museum Zool. Univ. Michigan 22:1–64.

BRASIL, LS., ANDRADE, AFA, RIBEIRO, BR, SPIGOLONI, ZA, JUEN, L. & DE MARCO, P. 2021. A niche-based gap analysis for the conservation of odonate species in the Brazilian Amazon. Aquat. Conserv. Mar. Freshwater Ecosyst. 31(5), 1150–1157.

BRASIL. DECRETO -LEI DECRETO-LEI Nº 356, DE 15 DE AGOSTO DE 1968. LEX. Presidência da República. Áreas da Amazonia Ocidental e outfras Províncias. Brasília, DF, 1968.

BRAZILIAN TAXONOMIC CATALOG OF FAUNA. http://fauna.jbrj.gov.br/fauna/listaBrasil/ConsultaPublicaUC/ConsultaPublicaUC.do (last access in 24/02/2022).

BURNHAM, K.P. & CHAZDON, R.L. 1998. Species Richness, Spatial Variation, and Abundance os the Soil Seed BAnl of a Secondary tropical Rain Forest. Biotropica 30 (2): 214-222

BURNHAM, K.P. & OVERTON, W.S. 1979. Robust estimation os population size when capture probabilities vary among animals. Ecology. 60:927-936.

BYBEE, S.M., KALKMAN, V.J., ERICKSON, R.J., FRANDSEN, P.B., BREINHOLT, J.W., SUVOROV, A., DIJKSTRA, K.D.B., CORDERO-RIVERA, A., SKEVINGTON, J.H., ABBOTT, J.C., HERRERA, M.S., LEMMON, A.R., LEMMON, E.M. & WARE, J.L. 2021. Phylogeny and classification of Odonata using targeted genomics. Mol. Phylogenet. Evol. 160, 107-115.

CALVÃO, LB, NOGUEIRA DS, DE ASSIS MONTAG L.F., LOPES M.A. & JUEN, L. 2016. Are Odonata communities impacted by conventional or reduced impact logging? For. Ecol. Manage. 382: 143-150.

CARVALHO, A.L. 1992. Evalidation of the Genus *Remartinia* Navás, 1911, with the description of a new species and a key to the genera of neotropical *Aeshnidae* (Anisoptera). Odonatologica 21(3): 289-298.

CARVALHO, A.L., FERREYRA JR, N., & NESSIMIAN, J.L. 1991. Descrição das larvas de três espécies do gênero *Erythrodiplax* Brauer (Odonata, Libellulidae). Rev. Bras. Entomol. 35(1), 165-171.

CATALOGO TAXONOMICO DA FAUNA BRASILEIRA. http://fauna.jbrj.gov.br/fauna/listaBrasil/ConsultaPublicaUC/ConsultaPublicaUC.do (last access in 24/02/2022).

CEZÁRIO, R.R., FIRME, P.P., PESTANA, G.C., VILELA, D.S., JUEN, L., CORDERO-RIVERA, A. & GUILLERMO, R. 2021. Sampling Methods for Dragonflies and Damselflies. In: Santos J.C., Fernandes G.W. (eds) Measuring Arthropod Biodiversity. Springer, Cham. 978-3-030-53225-3.

COSTA, J.M. & DE ASSIS, C.V. 1994. Description of the larva of *Tauriphila argo* Hagen, 1869 from São Paulo, Brazil (Anisoptera: Libellulidae). Odonatologica, 23 (1), 51-54.

COSTA, J.M. & OLDRINI, B.B. 2005. Distribuição de Odonata (Insecta) no Estado do Espirito Santo, Brasil. Museu Nacional, UFRJ. Publicações Avulsas do Museu Nacional 107: 115.

COSTA, J.M. & RÉGIS, L.P.JB. 2005. Description ofthelast instar larva of *Perithemis lais* (Perty) and comparison with other species of the genus (Anisoptera: Libellulidae). Odonalologica34(1): 51-57.

COSTA, J.M. & SANTOS, T.O. 2009. Description of the larva os *Orthemis schmitdti* (Odonata, Libellulidae). Iheringia, Sér. Zool. Porto Alegre, 99(2):129-131.

COSTA, J.M. SOUZA, L.O. & MUZÓN, J. 2006. Descriptions of three new species of Odonata from Brazil. Zootaxa, 1314(1), 53–68.

COSTA, J.M., MACHADO, A.B.M., LENCIONI, F.A.A & SANTOS, T.C. 2000. Diversidade E Distribuição Dos Odonata (Insecta) No Estado De São Paulo, Brasil: Parte I – Lista Das Espécies E Registros Bibliográficos. Publ. Avul. Mus. Nac., Rio de Janeiro, n.80, p.1-27, abr.2000

DE MARCO, P.J.R. & VIANNA, D.M. 2005 Distribuição do esforço de coleta de Odonata no Brasil – subsídios para escolha de áreas prioritárias para levantamentos faunísticos. Int. J. of Biodiver., 6(sup.), 13–26. Distribution of Odonata sampling effort in Brasil – basis for choosing prioritary áreas for faunistic inventories. Int. J. Biodivers. Sci. Gerenciar. 6, 13-26.

DE MARMELS, J & RÁCENIS, J. 1982. An analysis of the cophysa-group of *Tramea* Hagen, with descriptions of two new species (Anisoptera: Libellulidae). Odonatologica, 11(2), 109–128.

DE MARMELS, J. (2007). Thirteen new Zygoptera larvae from Venezuela (Calopterygidae, Polythoridae, Pseudostigmatidae, Platystictidae, Protoneuridae, Coenagrionidae). Odonatologica, 36(1), 27–51.

DE MARMELS, J. 1994. *Sympetrum chaconi* spec. nov. from Auyan-Tepui, Venezuela, with notes on a Pantepuyan form of *Tramea binotata* (Rambur) (Anisoptera: Libellulidae). Odonatologica, *23*(4), 405–412.

DEL PALACIO, A., LOZANO, F. & MUZÓN, J. 2019. Re-description of the last instar of *Remartinia luteipennis luteipennis* (Burmeister, 1839) (Odonata: Aeshnidae). Int. J. of Odonatol., 22 (1), 1–6.

DUNKLE, S.W. (1982) *Perithemis rubita* spec.nov., a new dragonfly from Ecuador (Anisoptera: Libellulidae). Odonatologica, 11(1), 33–39

ELLENRIEDER, N.V. & GARRISON, R.W. 2008. *Drepanoneura* gen. nov. for *Epipleoneura letitia* and *Protoneura peruviensis*, with descriptions of eight new Protoneuridae from South America (Odonata: Protoneuridae), Zootaxa,1842, 1-34.

ELLENRIEDER, N.V. 2013. A revision of *Metaleptobasis* Calvert (Odonata: Coenagrionidae) with seven synonymies and the description of eighteen new species from South America. Zootaxa, 3738 (1): 001–155.

ELLENRIEDER, N.V. 2014. A synopsis of the Neotropicalthe neotropical genus Nephepeltia (Odonata: Libellulidae), including description of a new species, synonymies, and a key to males. Zootaxa 3796 (1): 121–146.

FANTINI, A.C. & CRISÓSTOMO, C.F. 2009. Conflitos de interesse em torno da exploração madeireira na Reserva Extrativista Chico Mendes, Acre, Brasil. Bol. do Mus. Para. E. Goeldi. Ciências Humanas, 4(2), 231–246.

FIGUEIREDO, E.O. 2001. Reflorestamento com teca (*Tectona grandis* L.E) no Estado do Acre - Rio Branco: Embrapa Acre. 21(2), 28.

FIRME, B.C., SANTOS, C.R., SANTOS, L.R. & RODRIGUES, M.E. 2019. Checklist de Odonata na RPPN Veracel e áreas ao entorno, com novos registros para o Estado da Bahia. In PINTO, A.P., SALLES, F.F., DUMAS L.L. PASSOS MIS. (Eds.) Livro de resumos do V Simpósio de Insetos Aquáticos Neotropicais. Curitiba, p.53.

GARCIA JUNIOR, M.D.N., DAMASCENO, M.T.S., MARTINS, M.J.L., COSTA, T.S., FERREIRA, R.M.A. & SOUTO, R.N.P. 2021. New records of dragonflies and damselflies (Insecta: Odonata) from Amapá state, Brazil. Biota Neotrop, 21(1). https://doi.org/10.1590/1676-0611-BN-2020-1074

GARCIA JUNIOR, M.D.N., DAMASCENO, M.T.S., VILELA, D.S. & SOUTO, R.N.P. 2022. The Brazilian Legal Amazon Odonatofauna: a perspective of diversity and knowledge gaps. Ento. Brasilis. 15: e977.

GARRISON, R.W. & ELLENRIEDER, N.V. 2015. Damselflies of the genus *Argia* em of the Guiana Shield (Odonata: Coenagrionidae). Zootaxa, 4042(1), 1.

GARRISON, R.W. & ELLENRIEDER, N.V. 2018. Damselflies of the genus *Argia* (Odonata: Coenagrionidae) from Ecuador with descriptions of five new species. Zootaxa 4470 (1): 001–069.

GARRISON, R.W. 2009. A synopsis of the genus *Telebasis* (Odonata: Coenagrionidae). Int. J. of Odonatol. 12(1), 1–121.

GARRISON, R.W., ELLENRIEDER, N.V. & LOUTON, J.A. 2006. Dragonfly genera of the New World An illustrated and annotated key to the Anisoptera. Baltimore: The Jonhs Hopkins University Press. 368 pp.

GLOBAL BIODIVERSITY INFORMATION – GBIF https://www.gbif.org/what-is-gbif (last access in 03/03/2022)

GUILHERMO-FERREIRA, R. 2013. Description of the larva of *Telebasis griffinii* (Martin, 1896) (Zygoptera: Coenagrionidae). Odonatologica 42 (4): 383-387.

HORTAL, J., BELLO, F., DINIZ-FILHO, J.A.F., LEWINSOHN, T.M., LOBO, J.M. & LADLE, R.J. 2015. Seven Shortfalls that Beset Large-Scale Knowledge of Biodiversity. The Annual Rev.iew of EntomolEcology, Evolution, and Systematics is online at ecolsys. 46:523–49

IBGE – Instituto Brasileiro de Geografia e Estatística: cidades e estados. Brasil: IBGE. Disponível em: https://www.ibge.gov.br/cidades-e-estados/ac/. (last access in 22/09/2021).

KALKMAN, V.J., CLAUSNITZER, V., DIJKSTRA, K.D.B., ORR, A.G., PAULSON, D.R. & VAN TOL, J. 2008. Global diversity of dragonflies (Odonata) in freshwater. Hydrobiologia, 595 (1), 351-363.

KENNEDY, C.H. 1937. *Perilestes Castor* and *P. Pollux*, New Dragonflies from Ecuador, with Notes on *P. kKahli* (Odonata: Lestidae). Ann. Entomol. Soc. Am., 30(2), 410–424.

KINDT, R. & COE, R. 2005. Tree diversity analysis: a manual and software for common statistical methods for ecological and biodiversity studies. World Agroforestry Centre. 8, 137.

KIRBY, W. F. 1897.List of the Neuroptera collected by Mr. E. E. Austen on the Amazons &c. during the recent expedition of Messrs Siemens Bros Cable S. S. Faraday, with descriptions of several new species of Odonata (dragonflies). Ann. Mag. Nat. Hist. (6) 19:598-617.

KOROIVA, R., BRASIL, P.G., NEISS, U.G., VILELA, D.S. & HAMADA, N. 2020a. Dragonflies and damselflies (Insecta: Odonata) housed in the Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia, Brazil. Hetaerina. Vol. 2 (2): 14 -23.

KOROIVA, R., NEISS, U.G., FLECK, G. & HAMADA, N. 2020b. Checklist of dragonflies and damselflies (Insecta: Odonata) of the Amazonas state, Brazil. Biota Neotrop, 20 (1). https://doi.org/10.1590/1676-0611-BN-2019-0877 (last access in 16/12/2021)

KOROIVA, R., PEREIRA-COLAVITE, A., BATISTA, F.R.C. & VILELA, D.S. 2021. Checklist and contribution to the knowledge of the odonatofauna of Paraíba state, Brazil. Biota Neotrop. 21(3): e20211196. https://doi.org/10.1590/1676-0611-BN-2021-1196 (last access in 16/12/2021)

LENCIONI, F.A.A 2005. Damselflies of Brazil, an illustrated indentification guide: I – The non–Coenagrionidae families. São Paulo: All Print. 324 pp.

LENCIONI, F.A.A 2006. Damselflies of Brazil, an illustrated indentification guide: II – Coenagrionidae families. São Paulo: All Print. 419 pp.

LENCIONI, F.A.A 2013. Diagnoses and discussion of the group 1 and 2 Brazilian species of *Heteragrion*, with descriptions of four new species (Odonata: Megapodagrionidae). Zootaxa 3685(1): 001–080.

LIVRO VERMELHO DA FAUNA BRASILEIRA AMEAÇADA DE EXTINÇÃO.: Volume I / -- 1. ed. -- Brasília, DF: ICMBio/MMA, 2018. https://www.icmbio.gov.br/portal/images/stories/comunicacao/publicacoes/publicacoes-diversas/livro_vermelho_2018_vol1.pdf (last access in 21/04/2022)

LOZANO, F., MUZÓN, J. & SCATTOLINI, C. 2012. Description of the final stadium larva of *Telebasis obsoleta* (Selys, 1876) (Odonata: Coenagrionidae). Zootaxa, 3186(1), 54.

LOZANO, F., RODRÍGUEZ, J.S. & MOLINERI, C. 2017. *Acanthagrion peruvianum* Leonard, 1977 (Odonata Coenagrionidae) a junior subjetctive synonym of *A. floridense* Fraser, 1946 and description of it's final Stadium larva. Zool. Anz.. (270) 71-80.

MACHADO, A.B.M. & LACERDA, D.S.S. 2017.Revalidation of Platystigma Kennedy, 1920, with a synopsis of the quadratum species group and the description of three new species (Odonata: Pseudostigmatidae). Zootaxa, 4242(3), 493.

MACHADO, A.B.M. 2004. Studies on neotropical *Protoneuridae*. 15. *Amazoneura* gen. nov. of *A. juruaensis* sp. nov. (Odonata, Zygoptera). Rev. Bras. Zool. 21 (2): 333-336.

MACHADO, A.B.M. 2010a. *Philogenia marinasilva* Spec. Nov. from the state of Acre, Brazil (Zygoptera: *Megapodagrionidae*). Odonatologica 39 (2): 149-152.

MACHADO, A.B.M. 2010b. Seven new species of *Telebasis* from Brazil (Odonata: Coenagrionidae). Zootaxa, 2384(1), 53.

MACHADO, A.B.M., MESQUITA, H.G. & MACHADO, P.A.R. 1991. Contribuição ao conhecimento dos Odonatos na estação ecológica de maracá – Roraima. Acta Amaz. 21 (Único): 159-173.

MARTINS, W.B.R. 2020. Restauração de ecossistemas degradados pela mineração na Amazônia Oriental. Tese de Doutorado. Universidade Federal Rural da Amazônia, Belém,

MASCARENHAS, F.S., BROWN, I.F., & SILVA, S.A. 2018. Desmatamento e incêndios florestais transformando a realidade da Reserva Extrativista Chico Mendes. Desenvol. e Meio Ambiente. 48, 236-262.

MIGUEL, T.B., OLIVEIRA-JUNIOR, J.M.B., LIGEIRO, R. & JUEN, L. 2017. Odonata (Insecta) as a tool for the biomonitoring of environmental quality. Ecol. Indic. 81, 555-566.

MONTEIRO JÚNIOR, C.S., JUEN, L. & HAMADA, N. 2015. Analysis of urban impacts on aquatic habitats in the central Amazon basin: Adult odonates as bioindicators of environmental quality. Ecol. Indic. 48, 303–311.

MUZÓN, J. & GARRÉ, A. 2005. Description of the last instar larva of *Erythrodiplax paraguayensis* (Anisoptera: Libellulidae). Rev. Soc. Entomol. Argent. 64(1-2): 85-91.

NESSIMIAN, L.J., VENTICINQUE, E.M., ZUANON, J., MARCO JR, P., GORDO, M., FIDELIS, L., BATISTA, J.D. & JUEN, L. 2008. Land use, habitat integrity, and aquatic insect assemblages in Central Amazonian streams. Hydrobiologia, v 614, n 117.614: 117–131.

OKSANEN, J., BLANCHET, F.G., FRIENDLY, M., KINDT, R., LEGENDRE, P., MCGLINN, D. & WAGNER, H. 200518. Community ecology package. R package version, 2-5. http://sortie-admin.readyhosting.com/lme/R%20 Packages/vegan.pdf (last access in 21/04/2022)

OLAYA, M. 2019. Odonatos en Latinoamérica: la riqueza de nuestra región. Hetaerina. 1(2):4-5.

OLIVEIRA- JUNIOR, J.M.B. 2015. Estruturação da comunidade de odonata (insecta) na Amazônia Oriental: efeitos espaciais, ambientais e morfológicos em igarapés íntegros. 148 f. Tese (Doutorado) - Universidade Federal do Pará, Museu Paraense Emílio Goeldi, Instituto de Ciências Biológicas, Belém. Programa de Pós-Graduação em Zoologia. Disponível em: <http://repositorio.ufpa.br/jspui/handle/2011/9408>. Acesso em: 16/12/2021

OLIVEIRA, S.A.V. 2017. Composição e similaridade de espécies de Odonata em dois ambientes lóticos no complexo vegetacional sobre areia branca, Acre. In Complexo vegetacional sobre areia branca: campinaranas do sudoeste da Amazônia. Universidade Federal do Acre – Rio Branco: Edufac.

OLIVEIRA-JUNIOR, J.M.B. & JUEN, L. 2019. The Zygoptera/Anisoptera ratio (Insecta:Odonata): A new tool for habitat alterations assessment in Amazonian streams. Neotrop. entomol. 48 (4), 552–560.

PADRÃO, G.A., Lirio, V.F. & LIMA, J.E. 2016. Determinantes do desmatamento na Amazônia Legal: um estudo de caso do estado do Acre. Revista de Administração e Negócios da Amazônia, 8 (1), 85-108.

PALACINO-RODRIGUEZ. F. 2016. Two decades of progress in over one hundred years of study: Present status of Odonata research in Colombia. Odonatologica, 45(3/4), 327-334.

PALMER, M.W. 1990. The estimator of species richness by extrapolation. Ecology. 71: 1195-1198.

PAULSON, D.R. 1985. Odonata of the Tambopata Reserved Zone, Madre de Dios, Peru. Rev.ista Peru.ana de Entomologia. 27: 9-14

PAULSON, D.R. 2004. Critical species of Odonata in the Neotropics. Int. J. of Odonatol., 7(2), 163–188.

PEEL, M.C., FINLAYSON, B.L. & MCMAHON, T.A. 2007. Updated world map of the Koppen-Geiger climate classification. Hydrol. Earth Syst. Sci. 11(5), 1633–1644.

PÉREZ-GUTIERRÉZ LA & PALACINO-RODRIGUEZ F. 2011. Updated checklist of the Odonata known from colombia. Odonatologica, 40(3), 203-225.

PESSACQ, P. 2014. Synopsis of Epipleoneura (Zygoptera, Coenagrionidae, "Protoneuridae"), with emphasis on its Brazilian species. Zootaxa, 3872 (3), 201-234.

PINTO, A.P. 2021. Odonata in Catálogo Taxonômico da Fauna do Brasil. http://fauna.jbrj.gov.br/fauna/listaBrasil (last access in 12/04/2021).

R Core Team. 2019. R: A language and environment for statistical computing. R Foundation for Statistical Computing, https://www.R-project.org/. (last access in 21/04/2021)

RAIMUNDO, R.L.G., FREITAS, A.V.L., COSTA, R.N.S., DE OLIVEIRA, J.B.F., LIMA, A.F., MELO, A.B. & BROWN JR, K.S. 2003. Manual de monitoramento ambiental usando borboletas e libélulas – Reserva Extrativista do Alto Juruá. UNICAMP, (1), 36.

RIS, F. 1930. A revision of the *libelluline* genus *Perithemis* (Odonata). Misc. Publ. Mus. Zool. Univ. Mich. 21: 1-50.

RODRIGUES, M.E. & ROQUE, F.O. 2017. Checklist de Odonata do Estado de Mato Grosso do Sul, Brasil. Iheringia, Série Zoologia, 107(supl.): e2017117.

SÁNCHEZ-HERRERA, M. & WARE, J.L. 2012. Biogeography of Dragonflies and Damselflies: Highly Mobile Predators. Departament of Biology, Rutgers The State University of New Jersey, Newark Campus, USA.

SANTOS, E.L., ABREU, V.S., MIRANDA, E.N., LOPES, I.L., GAMA, L.E.S., SANTOS, N.P., BRUM, D.L., BERG, E.V.D., FARIAS, J.F. & RODRIGUES, E.S. 2021. Silvicultura e Manejo Florestal Técnicas de Utilização e Conservação da Natureza. Editora cientifica digital. 1 (25), 330-343.

SANTOS, N.D. 1973 Descrição da ninfa de *Perithemis mooma* Kirby, 1889 (Odonata: Libellulidae. Atas da Sociedade de Biologia do Rio de Janeiro, 16 (2/3), 71–72.

SEMA – Secretaria Estadual do Meio Ambiente do Estado do Acre. http://www.ac.gov.br/wps/portal/acre/Acre/governo-estado/secretarias/ (last access in 26/04/2021).

SOUZA, L.O.I., COSTA, J. M. & OLDRINI, B. B. 2007. Odonata. In: Guia on-line: Identificação de larvas de Insetos Aquáticos do Estado de São Paulo. Froehlich, C.G. (org.). http://sites.ffclrp.usp.br/aguadoce/Guia_onlin (last access in 10/03/2021)

SOUZA, M.M., SOUZA, B., PEREIRA, M.C.S.A & MACHADO, A.B.M. 2013. List of Odonates from Mata do Baú, Barroso, Minas Gerais, Brazil. Journal of species lists and distribution Check List, 9(6), 1367-1370.

SPECIES LINK. 2021. https://specieslink.net/ (last access in 12/04/2021).

STRAHLER, A.N. 1957. Quantitative analysis of watershed geomorphology. Trans., Am. Geophy. Union. 38(6), 913-920.

SUHLING, F. 2015. Thorp and Covich's Freshwater Invertebrates || Order Odonata, cap. 35, 893–932.

TAKIYA, D., SANTOS, A., PINTO, Â., HENRIQUES-OLIVEIRA, A., CARVALHO, A., SAMPAIO, B., CLARKSON, B., MOREIRA, F., AVELINO-CAPISTRANO, F., GONÇALVES, I., CORDEIRO, I., CÂMARA, J., BARBOSA, J., DE SOUZA, W. & RAFAEL, J. 2016. Aquatic Insects from the Caatinga: checklists and diversity assessments of Ubajara (Ceará State) and Sete Cidades (Piauí State) National Parks, Northeastern Brazil. Biodivers. Data J. 4: e8354.

TENNESSEN, K.J, TRAPERO-QUINTANA, A. & FERREIRA, F.A. 2017. Description of the Nymph of Tramea binotata (Rambur, 1842) (Odonata: Libellulidae). Zootaxa 4337 (3).

TERRA, G. 2017.Efetividade da Fiscalização do Desmatamento Ilegal nas Unidades de Conservação Federais no Estado do Acre. INPA. MPGAP.

THE IUCN RED LIST OF THREATENED SPECIES. 2022. https://www.iucnredlist.org/ (lat access in 21/04/2022).

TOGNELLI, M.F., LASSO, C.A., BOTA-SIERRA, C.A., JIMÉNEZ-SEGURA, L.F. & COX, N.A. 2016. Estado de Conservación y Distribución de la Biodiversidad de Agua Dulce en los Andes Tropicales. Gland, Suiza, Cambridge, UK y Arlington. 199.

TORRES-PACHÓN, M., NOVELO-GUTIÉRREZ, R. & ESPINOSA DE LOS MONTEROS, A. (2017). Phylogenetic analysis of the genus *Argia* Rambur, 1842 (Odonata: Coenagrionidae), based on morphological characters of larvae and mitochondrial DNA sequences. Organisms Diversity & Evolution, 17(2), 409–420.

VENABLE, G.L., & ERWIN, T.L. 1996. Mapping of the biodiversity site at Pakitza. Pp. 29-42, in Manu: The biodiversity of Southeastern Peru (D.E. Wilson and A. Sandoval, eds.). Smithsonian Institution Press. 679.

WILLIAMSON, E.B. 1923. Notes on American species of Triacanthagyna and Gynacanta. Misc. Publ. Mus. Zool. Michigan (9):1-78.

Received: 17/01/2022
Accepted: 02/05/2022
Published online: 24/06/2022