The diversity of Odonata adults's at Pampa Biome from Brazil

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Abstract: The growth of humankind has brought with it several environmental problems that have worsened over time, including the loss of insect biodiversity. The Odonata order have been indicated by several authors as relevant bioindicators for assessing and monitoring environmental conditions of specific locations. The main objective of this study was to conduct an inventory of the Odonata diversity in the Pampa Biome, of the Southern region of the state of Rio Grande do Sul, Brazil. The species survey was conducted between November 2014 and October 2015. Adult insects were collected in Capão do Leão, Pelotas and Rio Grande cities. Each location was visited nine times, totalizing 54 samplings. Entomological nets were used for capturing adult insects, which were then kept in entomological envelopes. The identification of the specimens was carried out with taxonomic keys of Lencioni and Heckman. In addition, Chao-1, the Shannon-Wiener and Jackknife indexes were associated with the sampling areas. During the species survey a total of 2 680 Odonata specimens were collected, representing 45 species encompassed in 22 genera and six families. The Libellulidae and Coenagrionidae families were registered in 60 and 30 % of the specimens sampled, followed of the Aeshnidae, Calopterygidae, Gomphidae and Lestidae, of reduced occurrence. The genera *Erythrodiplax*, *Micrathyria* and *Ischnura* were found at least once in all the visited sites. The study resulted in the registration for the first time of the following species: *Progomphus complicatus* Selys, *Lestes minutus* Selys, *Homeoura ambigua* Ris, and *Tauriphila xiphea* Ris. These species were not previously reported in any Odonata study of the Brazilian state of Rio Grande do Sul. In regard to Odonata diversity in the Southern region of Rio Grande do Sul, Libellulidae and Coenagrionidae are the families more abundants. *Erythrodiplax* and *Micrathyria* are the most common genera. *Miathyria marcella* represented 9.6 % of all collected libellulidae and was the most abundant specie. Capão do Leão has the largest species diversity (wealth), the largest number of collected specimens and more diversity than Pelotas and Rio Grande. However, the results showed that the Odonatofauna in the State are still little known, and new studies are needed to better describe this group in other regions.

Key words: Insecta; biodiversity; Rio Grande do Sul; dragonflies; fauna indexes.

Rio Grande do Sul (RS) State is located in the Southernmost territory of Brazil. It coverseveral regions and environments diversified climatic and geomorphologically. The Pampa Biome is located in the Southern of the state and is made up of a set of distinct ecosystems containing vast biodiversity. Although it remains mostly unexplored, this area consists of an extremely rich gene pool (Boldrini et al., 2010).

These ecosystems have been affected by several human activities, such as inadequate use of the soil, inadequate disposal of industrial and domestic effluents, as well as the increasing use of agrochemicals (Esteves, 2011). This has contributed to biodiversity loss, jeopardizing the balance of aquatic and terrestrial biomes and, consequently, impacting human welfare (Cardinale et al., 2012). According to Merritt and Cummins (1996) invertebrates are one of the most common groups in freshwater environments, and, among them, insects stand out because of their association with other freshwater communities.

The Odonata order comprise insects commonly known as dragonflies, damselflies, lavabunda, zig-zag, and, specifically in Rio Grande do Sul, Cicadas. This order is composed of paleopterous amphibiotic insects, under hemimetabolous development, and is divided into three suborders: Zygoptera, Anisoptera and Anisozygoptera (Rehn, 2003). Globally, this order contains 6 500 species (Trueman & Rowe, 2009), and about 800 of them from 15 different families were reported in Brazil alone (Neiss & Hamada, 2014).

These insects are relevant bioindicators for assessing and monitoring environmental conditions of specific locations. Thus, the greater the biodiversity, the better the health of that ecosystem (Ferreira-Peruquetti & De Marco, 2002; Foote & Rice, 2005; Silva, Marco, & Resende, 2010; Carvalho, Silva-Pinto, Oliveira-Júnior, & Juen, 2013; Monteiro Júnior, Couceiro, Hamada, & Juen, 2013). In this context, some researchers have recognized the need to list the diversity of these animals and develop models and criteria that can be applied in environmental change assessments (Reaka-Kudla, Wilson, & Wilson, 1997).

Species inventories are indispensable in management and conservation processes, in which the entomofauna diversity is an important tool for environmental sanity. Furthermore, the knowledge of insect diversity may provide valuable information on the integrity of the studied environments (Lutinski & Garcia, 2005).

According to the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN), one in ten Odonata species is in critical danger of being extinct (Mace et al., 2008), and 35 % of them species lack incidence data (Clausnitzer et al., 2009). In Rio Grande do Sul (RS), there are very few studies that address the Odonata inventory and are limited almost exclusively to the reports made by Costa (1971) and Teixeira (1971) in Santa Maria and Porto Alegre cities, respectively. The last data concerning Odonato fauna in RS are present in the work of Kittel and Engels (2014), who studied the diversity of Zygotera in São Francisco de Paula. They included four new species in the list of registered species of the State. Furthermore, Renner, Périco, Sahlén, Dos Santos, and Consatt (2015) conducted an inventory study in 12 cities of the Rio Taquari valley region, where 50 Odonata species were found.

This study aims to widen the knowledge on the Odonata species and measure the species incidence in the aforementioned region. In addition, fauna indexes will be associated with the sampling areas.

MATERIALS AND METHODS

Field of study: Known as the "Southern fields", the Pampa Biome covers approximately 62 % of Rio Grande do Sul (177 767 km^2) along with part of Argentina and the entire territory of Uruguay, which is rich in water resources. Most of the water bodies are ecologically classified as shallow lakes, which are easily influenced by natural and human activity because of their shallow depth (Trindade, Furlanetto, & Silva, 2009; Zambrano, Contreras, Hiriart, & Arista, 2009). The sampling areas are located in the Lagoa Mirim and Lagoa dos Patos, both lakes with well defined seasons with cold and rainy winters and hot and dry summers. According to the Köppen-Geiger climate classification, local climate is considered Cfa (humid subtropical). In this region, average annual temperature varies between 16 ºC and

18 ºC and average annual rainfall is approximately 1 500 mm.

In the cities where the study was conducted, two collection sites were selected with three sampling points each. In Capão do Leão, sampling was conducted at Campus of the Federal University of Pelotas – UFPel (31º80'16" S - 52º41'94" W) and at Irmão Teodoro Luis Botanical Garden (31º81'27" S - 52º43'58" W). In Pelotas, the samples were collected in Vila Princesa (31º62'79" S - 52º32'66" W) and Balneário dos Prazeres (31º72'07" S - 52º19'14" W). In Rio Grande city, the samples collected in Arroio Bolaxa (32º16'02" S - 52º18'80" W) and Taim Ecological Station (32º 44'33" S - 52º 34'28" W).

Collected data: Odonata samples were obtained between November 2014 to October 2015; no samples were taken during the winter season because of the lack of activity among adult insects due to low temperatures. Each location was visited nine times, totalizing 54 samplings. In order to capture the insects, the active collection method was conducted with entomological nets. The samplings were performed on sunny days, between 9 am to 4 pm, during a period of three hours at each collection site.

Species identification: The collected specimens were kept alive in entomological envelopes for at least four hours and were later treated with Acetone, as methodology proposed by Lencioni (2005). Samples were identified using the taxonomic keys proposed by Lencioni (2005; 2006) and Heckman (2006; 2008). Damaged especimens or those that had no similarity with the descriptions offered in literature were classified at generic level. The specimens were deposited at the Ceslau Biezanko Entomological Museum, UFPEL.

Data analysis: The data analyses were conducted considering specific abundance (n), generating the species-accumulation curve. Relative frequency (Rf) was measured by dividing the total number of collected species

by the total of collected insects, multiplied by 100 (Silveira Neto, Nakana, Barbin, & Vila Nova, 1976; Bianconi, Mikich, & Pedro, 2004). For this measurement, a 5 % confidence interval was used, and species were classified as very frequent (C ≥ 50 %), frequent (25 % ≤ C < 50 %) and infrequent (C < 25 %).

The abundance assessments and comparisons were conducted using the Chao-1 estimator. Based on abundance, this evaluation relates the number of species represented by only one individual (*singletons*), and the number of species with only two sample individuals (*doubletons*) (Colwell, 2012). Furthermore, it is calculated by the equation: Chao 1 = S + (a²/2b); in which *S* is the number of encountered species in the samples, *a* is the number of species represented by one specimen, and *b* is the number of species represented by two specimens (Chao, 1984; 1987; Ferraz, Gadelha, & Aguiar-Coelho, 2009).

The diversity measurement was performed using the Shannon-Wiener index: H'= -Σ (*fi*) log (*fi*); in which *fi* is the proportion of individuals belonging to the nth specie and *ln* is the neperian logarithm (Pielou, 1975).

For the species-diversity estimates and their confidence intervals (95 %), the analytical estimator first-order Jackknife index was used (Jack 1 = S + L (n-1/n), in which S is the sum of the species found in the samples, L is the number of species present in a single sample, and n is the total number of samples (Palmer, 1991). For calculations and graph and table elaboration, Excel and EstimateS 8.0 programs were used.

RESULTS

Considering all our sample collections, 2 680 specimens were found, comprised by 45 species distributed into 22 genera and 6 families (Table 1). The species *Progomphus complicatus*, *Lestes minutus*, *Homeoura ambigua* and *Tauriphila xiphea* were recorded for the first time, in ascending order of frequency, in RS (Table 1).

TABLE 1

List of the species collected in the Brazilian Pampa Biome (Southern region of Rio Grande do Sul)
divided by suborder and families

Family / Species	Collection Sites[1]						Total	%	Fr[2]
Suborder Zygoptera	PBP	PVP	CHB	CCL	RAB	RET			
Calopterygidae									
Hetaerina rosea Selys, 1853	5	9	0	3	2	0	19	0.671	IF
Coenagrionidae									
Acanthagrion gracile Rambur, 1842	2	1	0	1	2	0	6	0.223	IF
Acanthagrion lancea Selys, 1876	0	0	0	3	1	0	4	0.149	IF
Homeoura chelifera Selys, 1876	0	26	48	23	10	26	133	4.964	VF
Homeoura ambígua Ris, 1904*	7	2	2	4	0	0	15	0.559	IF
Ischnura capreolus Hagen, 1861	36	26	41	47	29	40	219	8.137	VF
Ischnura fluviatilis Selys, 1876	41	29	29	56	30	39	224	8.361	VF
Oxyagrion terminale Selys, 1876	10	0	0	9	0	5	24	0.895	IF
Oxyagrion simile Costa, 1978	0	0	0	5	0	0	5	0.186	IF
Telebasis willinki Fraser, 1948	44	19	24	36	15	45	183	6.830	VF
Lestidae									
Lestes undulatus Say, 1839	8	10	0	9	8	0	35	1.306	IF
Lestes tricolor Erichson, 1848	7	11	0	0	9	0	27	1.007	IF
Lestes minutus Selys, 1862*	0	0	0	0	0	8	8	0.298	IF
Suborder Anisoptera									
Aeshnidae									
Coryphaeschna amazonica DeMarmels, 1989	4	0	5	1	0	1	11	0.410	IF
Remartinia luteipennis Burmeister, 1839	0	6	3	4	5	0	18	0.671	IF
Rhionaeschna bonariensis Rambur, 1842	11	18	10	22	9	19	89	3.322	F
Rhionaeschna cornigera Brauer, 1865	0	0	6	11	0	0	17	0.634	IF
Gomphidae									
Progomphus complicatus Selys, 1854*	0	6	0	0	0	0	6	0.223	IF
Phyllocycla sp. Calvert, 1948	0	0	0	7	0	0	7	0.261	IF
Libellulidae									
Diastatops Intensa Montgomery, 1940	0	3	0	4	2	0	9	0.335	IF
Erythemis attala Selys in Sagra, 1857	0	23	18	22	15	41	119	4.441	VF
Erythemis plebeja Burmeister, 1839	0	7	4	16	8	10	45	1.679	F
Erythemis peruviana Rambur 1842	0	35	20	30	13	7	105	3.919	F
Erythemis vesiculosa (Fabricius, 1775)	0	0	1	5	0	4	10	0.373	IF
Erythrodiplax fusca Rambur, 1842	21	16	9	31	10	30	117	4.367	VF
Erythrodiplax nigricans Rambur, 1842	0	18	0	24	0	2	44	1.642	F
Erythrodiplax paraguayensis Förster, 1904	5	0	3	7	4	2	21	0.783	IF
Erythrodiplax atroterminata Ris, 1911	30	20	27	28	12	33	150	5.559	VF
Erythrodiplax chromoptera Borror, 1942	0	0	0	7	4	0	11	0.410	IF
Erythrodiplax media Borror, 1942	14	38	32	20	29	23	156	5.823	VF
Erythrodiplax hyalina Förster, 1907	10	6	8	19	1	5	49	1.829	F
Erythrodiplax sp. Brauer, 1868	1	2	4	3	1	1	12	0.485	IF
Miathyria marcella Selys in Sagra, 1857	28	58	40	31	27	75	259	9.667	VF
Micrathyria tibialis Kirby, 1897	0	0	2	1	0	1	4	0.149	IF
Micrathyria hypodidyma Calvert, 1906	33	51	39	30	30	22	205	7.652	VF
Micrathyria pseudeximia Westfall, 1992	8	23	10	9	17	14	81	3.023	F
Micrathyria stawiarskii Santos, 1953	0	0	4	1	1	2	8	0.289	IF

| Family / Species | Collection Sites[1] | | | | | | Total | % | Fr[2] |
Suborder Zygoptera	PBP	PVP	CHB	CCL	RAB	RET			
Micrathyria catenata Calvert, 1909	0	2	0	5	1	0	8	0.289	IF
Orthemis nodiplaga Karsch, 1891	1	8	0	16	9	12	46	1.717	F
Orthemis ambinigra Calvert, 1909	3	5	0	2	3	6	19	0.709	IF
Pantala flavescens Fabricius, 1798	0	13	0	8	17	9	47	1.754	F
Perithemis mooma Kirby, 1889	2	9	1	5	7	3	27	1.007	IF
Tauriphila risi Martin, 1896	12	4	0	8	11	6	41	1.530	F
Tauriphila xiphea Ris, 1913*	0	6	0	3	2	12	23	0.858	IF
Tramea cophysa Hagen, 1867	2	5	0	3	1	3	14	0.522	IF
Total	345	515	390	579	345	506	2 680	100	
Total by County	860		969		851				

[1]Pelotas, Balneário dos Prazeres (PBP) and Vila Princesa (PVP). Capão do Leão, Irmão Teodoro Luis Botanical Garden (CHB) and Capão do Leão Campus of the Federal University of Pelotas– UFPel (CCL). Rio Grande Arroio Bolaxa (RAB) and TAIM Ecological Station (RET). [2]Frequency was indicated as follows: infrequent (IF), frequent (F) and very frequent (VF).*Newly-reported species in RS.

The most speciose genera were *Erythrodiplax* and *Micrathyria*, with eight and five species, respectively. These genera, represented by two species (*Rhionaeschna bonariensis* and *Telebasis willinki*), along with *Ischnura*, were found at least once in all the visited sites. Gomphidae specimens were less frequent and exhibited low density in this study, since *P. complicatus* specimens were found only in Pelotas, specifically on sandbanks of Arroio Pelotas, located in Vila Princesa. Female *Phyllocycla* were collected close to the pools of UFPel Campus in Capão do Leão (Table 1).

Ten species, from the Libellulidae (6) and Coenagrionidae (4), were considered very frequent (VF), reaching a total of 65 % of the captured individuals. The Gomphidae and Calopterygidae were represented by 32 total specimens, corresponding to 1.19 % of the collected insects and considered infrequent (IF) (Table 1).

The Libellulidae family was the most abundant since it comprising 57.78 % of the samples (Table 2), in which *Miathyria marcella* was the most common specie, amounting to 9.66 % of total dragonfly samples (Table 1). The next most common families were Coenagrionidae and Aeshnidae, with a total of 20 % and 8.89 % of the specimens, respectively. Lastly, the least abundant families were Lestidae with 6.67 %, Gomphidae with 4.44 %, and Calopterygidae with 2.22 % of the sampled species. Concerning the sample density, the Libellulidae family comprised 60.82 % of total

TABLE 2

Number of Odonata species collected in the the Brazilian Pampa Biome (Southern region of Rio Grande do Sul) from each family, their percentage (%) in relation to the total of collected species and to the total of collected specimens

Suborder	Family	Number of species	Percentage (%)	Density (%)
Zigoptera	Coenagrionidae	9	20.00	30.35
	Lestidae	3	6.67	2.61
	Calopterygidae	1	2.22	0.70
Anisoptera	Libellulidae	26	57. 78	60.82
	Aeshnidae	4	8.89	5.03
	Gomphidae	2	4.44	0.49
Total		45	100	100

TABLE 3
Fauna data analyses of the species collected in all three cities in the Brazilian Pampa Biome

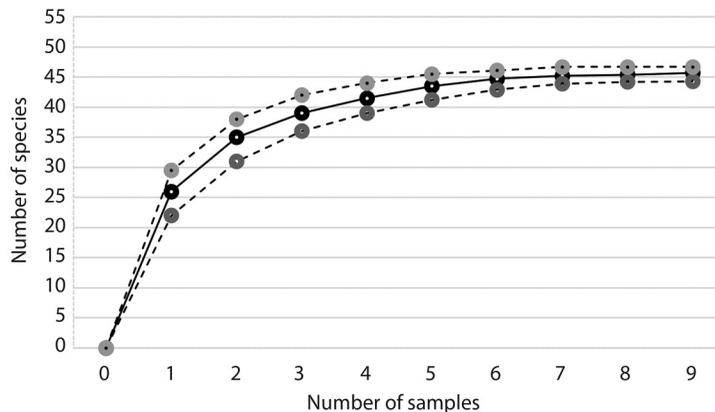| Faunistic indexes	Capão do Leão	Pelotas	Rio Grande
Individuals (n)	969	860	851
Species diversity	42	36	40
Shannon-Wiener (H')	1.62	1.49	1.54
Chao -1	46.3	48.6	48.0

Fig. 1. The species accumulation curve of Odonata using the Jackknife index (Jack 1) in the Brazilian Pampa Biome The dashed lines represent the confidence interval (CI 95).

collected specimens, followed by Coenagrionidae of the Zigoptera suborder at 30.35 % of total collected Odonata (Table 2).

Based on the different faunistc indexes (faunistic) (Table 3), the highest number of specimens were collected in Capão do Leão, followed by Pelotas, and Rio Grande, with 969, 860, and 851 specimens respectively. In addition, the highest specific wealth was also found at Capão do Leão, where 42 species were reported, while in Rio Grande and Pelotas 40 and 36 species were collected, respectively.

In the current study, the highest Shannon-Wiener diversity indexes were found in Capão do Leão (1.62) and Rio Grande (1.54), while Pelotas (1.49) exhibited the lowest result. On the other hand, regarding the species-diversity estimator, Chao 1 method, Pelotas reached the highest value, followed by Rio Grande (48.0) and Capão do Leão (46.3) (Table 3).

The species accumulation curve (Fig. 1) was unable to reach the asymptote, indicating that the diversity in the region is relatively larger than the 45 species found in the current study. The first-order Jackknife index is 57.3 species, with standard deviation of ± *8.2*.

DISCUSSION

The heterogeneity of the sampled environments enabled us to collect 45 Odonata species. Regarding their frequency, 26 of 45 species occurred infrequently (IF), totaling 57.78 %, ten species were found very frequently (VF), comprising 1 765 collected specimens, and nine species were considered frequent (F) (Table 1).

Regarding genus diversity, De Figueiredo et al. (2013) found 34 Odonata genera in the Rio Ibicuí river basin in Central RS. Their results were higher than the results obtained in this study, which was conducted in the Southern region of the state. However, inferior diversity wealth in this region may be due to insufficient studies. In addition, the huge fields

of the Pampa Biome, permeated with small forest areas and several types of water bodies, are ideal environments for Odonata (Maluf, 2000).

The UFPel Campus, located in Capão do Leão city, exhibited 42 species, the greatest diversity among all collection sites. Furthermore, Capão do Leão was also where the highest number of insects were captured (579) (Table 1). These data indicate that, despite flow of people in the university campus, the sampling area, that is far away, provide adequate conditions for the Odonata diversity found in the present study. In Rio Grande, the greatest diversity was observed in Arroio Bolaxa, with 34 collected species, while at the Taim Ecologic Station 31 species were observed. The difference in total species found in Arroio Bolaxa and in Taim, may have occurred because of the larger green area exhibited in the first (Juen & De Marco, 2012). Contrarringly to diversity, 161 more specimens were collected at Taim Ecologic Station than in Arroio Bolaxa.

According to the Shannon-Wiener index (H'), the lowest diversity was found in Pelotas (Table 3). This may be attributed the fact that the collection sites in this city constantly suffer human disturbances, which, according to Clausnitzer & Jödicke (2004), occur when industrial and/or domestic effluents are inadequately disposed, i.e. in locations close to urban areas. This describes Vila Princesa, an area located near the BR116 road. Human disturbances are also found in the Balneário dos Prazeres collection site, which exhibits large flow of people, such as residents and bathers. The impacts caused on Odonata diversity by human actions in these areas are still unclear, especially because these types of studies are rare in Brazil (Ferreira-Peruquetti & De Marco, 2002; Clausnitzer et al., 2009). In Pelotas, although lower species diversity was found, its Chao 1 index was higher than Capão do Leão and Rio Grande, estimating 48.6 species. This difference may be because the latter index considers rare species, i.e. it analyzes the number of species represented by only one specimen and the number of species represented by only two sample specimens.

Dragonflies are outstanding insects that can be affected both by environmental (Juen & De Marco, 2011) and spacial factors (Juen, Cabette, & De Marco, 2007; Clausnitzer et al., 2009). This indicates that these insects are potential bioindicators for monitoring the quality of aquatic environments (Ferreira-Peruquetti & De Marco, 2002). Furthermore, dragonflies may be considered valuable tools of freshwater environments, since the diversity of immature Odonata in the environment elucidates the diversity of the entire macroinvertebrate community (Foote & Rice, 2005).

Twenty-six of the 45 collected species were from the Libellulidae family, which can be explained by the fact that most of these specimens are generalist and can be found in many different environments. Like the rest of the Anisoptera suborder, this family exhibits the largest insects of all Odonata, making them more capable of flying and distributing themselves geographically (Kalkman et al., 2008; Juen & De Marco, 2012).

M. marcella was the most common of this study with 259 captured specimens and is considered VF at 9.66 % frequency. This may be explained by the fact that it is an abundant and generalist specie. In fact, *M. marcella* is strongly associated with floating vegetation, such as *Eichhornia* and *Pistia*, commonly known as water hyacinth and water lettuce, respectively. Dragonflies deposit their eggs on these floating plants (Paulson, 2017) for reproduction, which is in agreement with the sampling environments studied here.

Concerning the species reported for the first time in Rio Grande do Sul state, *P. complicatus* was collected only six times, all of which occurred in the city of Pelotas. *L. minutus* specimens were collected only in Rio Grande and Taim, and all 15 specimens of the *Homeoura ambígua* were collected in Rio Grande. *T. xiphea* specimens were present in all the sampling locations, having been most frequent in Rio Grande, totaling 23 individuals. The aforementioned species expanded its geographic distribution since it was previously only found in Paraguay, Argentina and Rio de

Janeiro (Heckman, 2006). Regarding frequency, all the specimens reported for the first time were classified as IF.

According to Juen et al., (2007), the distributions of some species are limited by physical and ecological factors. Having that in mind, Southern landscape of RS favors the species that are more agile and more capable of dispersion, since the vegetation is composed mainly by open fields. This may explain the low diversity of Zygoptera found during this study, considering that the small forest areas present in this region are mostly spread out and distant from one another. Due to their type of thermoregulation, these small specimens would have trouble taking long flights in open fields (De Marco & Resende, 2002). In addition, according to Carvalho, Oliveira-Junior, Faria, and Juen (2013), the Zygoptera would have trouble surviving in open spaces exposed to light and heat.

The sampling efficiency reached in this study was around 78 % (Jack 1) of the expected diversity and was far from reaching the asymptote. This shows that the number of existing species in the studied region is larger than the 45 species found in the present study and that more sampling efforts are required in all regions of the state to find the expected diversity.

Although this study presents the Odonata diversity found in a small sample portion of the Pampa Biome in the south of Rio Grande do Sul, the data are still limited. The species herein reported for the first time in the state show that more studies must be conducted so more precise data about the species of the region can be observed. Furthermore, aquatic sampling should be include the collection of immature stages.

In conclusion, *Progomphus complicatus*, *Lestes minutus*, *Homeoura ambigua*, and *Tauriphila xiphea* were reported for the first time in the State of Rio Grande do Sul. In regard to the Odonata diversity in the Brazilian pampa biome, 45 species were encompassed in 22 genera and the most commonly found genera were *Erythrodiplax* and *Micrathyria*. Concerning the occurrence frequency, 26 species were considered infrequent, 9 were frequent, and 10 were very frequent. The city of Capão do Leão exhibited the largest species diversity (wealth), the largest number of collected specimens, and greatest diversity, in comparison to Pelotas and Rio Grande. The *Miathyria marcella* species represented 9.6 % of all collected libellulidae and was the most abundant species.

Ethical statement: authors declare that they all agree with this publication and made significant contributions; that there is no conflict of interest of any kind; and that we followed all pertinent ethical and legal procedures and requirements. A signed document has been filed in the journal archives.

RESUMEN

Diversidad de adultos de Odonata en el Bioma Pampa brasileño. El crecimiento de la humanidad ha traído consigo varios problemas ambientales que han empeorado con el tiempo, incluida la pérdida de biodiversidad de insectos. Varios autores han mencionado especies del orden Odonata como bioindicadores relevantes para evaluar y controlar las condiciones ambientales de lugares específicos. El objetivo principal de este estudio fue realizar un inventario de la diversidad de Odonata en el Bioma Pampa, en la región sur del estado de Rio Grande do Sul, Brasil. El censo de especies se realizó entre noviembre 2014 y octubre 2015. Se recolectaron insectos adultos en las ciudades de Capão do Leão, Pelotas y Rio Grande. Cada área fue visitada nueve veces, totalizando 54 muestreos. Se usaron redes entomológicas para capturar insectos adultos, que luego se mantuvieron en sobres entomológicos. La identificación de los ejemplares se realizó con claves taxonómicas de Lencioni y Heckman. Además, Chao-1, los índices de Shannon-Wiener y Jackknife se asociaron

con las áreas de muestreo. Durante el censo de especies se recolectó un total de 2 680 especímenes de Odonata, que representan 45 especies comprendidas en 22 géneros y seis familias. Las familias Libellulidae y Coenagrionidae se registraron en 60 y 30 % de los especímenes muestreados, seguidos de los Aeshnidae, Calopterygidae, Gomphidae y Lestidae, de presencia reducida. Los géneros *Erythrodiplax*, *Micrathyria* e *Ischnura* se encontraron al menos una vez en todos los sitios visitados. El estudio resultó en el registro por primera vez de las siguientes especies: *Progomphus complicatus* Selys, *Lestes minutus* Selys, *Homeoura ambigua* Ris y *Tauriphila xiphea* Ris. Estas especies no se informaron previamente en ningún estudio de Odonata en el estado brasileño de Rio Grande do Sul. Con respecto a la diversidad de Odonata en la región sur de Rio Grande do Sul, Libellulidae y Coenagrionidae son las familias más abundantes. *Erythrodiplax* y *Micrathyria* son los géneros más comunes. *Miathyria marcella* representó el 9.6 % de todos los libellulidae recolectados y fue la especie más abundante. La ciudad de Capão do Leão tiene la mayor diversidad de especies (riqueza), la mayor cantidad de especímenes recolectados y la mayor diversidad que Pelotas y Río Grande. Sin embargo, los resultados mostraron que la Odonatofauna en el estado aún es poco conocida, y se necesitan nuevos estudios para describir mejor este grupo en otras regiones.

Palabras clave: Insecta; biodiversidad; Rio Grande do Sul; libélulas; índices de fauna.

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