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Odonata (Insecta) checklist in reserves in Campos y Malezales ecoregion in Misiones, with new distributional records

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Lista de especies de Odonata (Insecta) en reservas en la ecorregión de Campos y Malezales de Misiones, Argentina, con nuevos registros de distribución

RESUMEN. La odonatofauna de cuatro reservas ubicadas dentro de la ecorregión de Campos y Malezales en Misiones fue relevada entre 2014 y 2018. Se confeccionó una lista de 36 especies y 8 morfotipos, pertenecientes a seis familias de Anisoptera y Zygoptera, representando en conjunto el 22% de las especies conocidas en la provincia. La familia mejor representada fue Libelullidae (22 especies), seguida por Coenagrionidae (15 especies). Un registro es nuevo para Argentina (*Minagrion waltheri* Selys) y otro para la provincia de Misiones (*Tholymis citrina* Hagen).

PALABRAS CLAVE. Conservación. Diversidad. Libélula.

ABSTRACT. The dragonfly fauna of four reserves located in Campos y Malezales ecoregion, Misiones Province, was studied between 2014 and 2018. Thirty-six species and eight morphotypes, belonging to six families of Anisoptera and Zygoptera were identified, representing together 22% of the known species in the Province. Libellulidae was the family with the highest number of species recorded (22 species) followed by Coenagrionidae (15 species). Two species were new records, one for Argentina (*Minagrion waltheri* Selys), and one for Misiones province (*Tholymis citrina* Hagen).

KEYWORDS. Conservation. Diversity. Dragonfly.

INTRODUCTION

Campos y Malezales ecoregion comprises an approximate area of 26,000 km. in the southern portion of Misiones and north of Corrientes provinces, in NE Argentina. The landscape in this ecoregion is dominated by pastures and grasslands with isolated patches of forests and a dense canopy forest bordering the fluvial courses. This area represents an ecological transition among the limiting ecoregions: Selva Paranaense to the northeast, Esteros del Iberá and Espinal to the southwest (Matteucci, 2012), which favors the presence of a rich fauna including several regional threatened species and a great floristic diversity (Cabrera, 1994). Despite this, it is the least protected region of the country (Chebez, 2005) and at the same time, one of the most threatened due to its small area, increasing agriculture, forestation with exotic species, and growing urbanization.

According to the latest checklist, 282 species of odonates are known to be present in Argentina, of which 195 have been cited in Misiones, a highly diverse

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province (Lozano et al., 2020). However, these values are higher on the region enclosed in the Selva Paranaense ecoregion (represented in Argentina only in Misiones province) where 170 species have been recorded, while Campos y Malezales ecoregion (represented in Argentina in Corrientes and Misiones province), presents 94 species (Lozano et al., 2020). The unequal distribution of species may be in part due to the higher biodiversity of the Selva Paranaense, but also to a different sampling effort regarding Odonata in Misiones, with the majority of the surveys historically dedicated to the forested sector, leaving the area of Campos y Malezales underrepresented. This lack of knowledge contrasts with the fact that regional biodiversity inventories and species distribution records are important to support conservation strategies for species and their habitats (Renner et al., 2017).

The main goal of this work is to present the first checklist of Odonata diversity conducted in four reserves present in Campos y Malezales ecoregion, two of them including the ecotone with Selva Paranaense in Misiones province, provide new records and to contribute to the knowledge of the Odonata fauna of the region for future conservation studies.

MATERIAL AND METHODS

Study area

The study was carried out in streams of four reserves, located in the southern range of the Misiones province (Campos y Malezales ecoregion) (Fig. 1, Table I). The climate is subtropical humid, with uniform rainfall throughout the year, between 1,500-1,700 mm annual and average temperature ranging 20 - 22 °C (Cabrera, 1994; Matteucci, 2012). This study was centered on lotic environments, the streams surveyed in these reserves belong to the Paraná basin. For the ecoregion scheme we followed Matteucci (2012).

Reserves and their main characteristics

1. Parque Provincial de la Sierra Crovetto, San José. With an area of 1,088 ha, it was created in 1996 for the conservation of the two ecoregions present in the area: in the southern sector we find a portion of Campos y Malezales ecoregion, and in the north, a portion of Selva Paranaense ecoregion (Chebez, 2005; Matteucci, 2012).

2. Parque Provincial Cañadón de Profundidad, Profundidad. Presents an area of 19 ha in Campos y Malezales ecoregion, with native flora and forested areas bordering the stream, protected since 1991 (Chebez, 2005; Matteucci, 2012).

3. Reserva Privada Campo San Juan, Santa Ana. Although more recent, it is the largest reserve in the ecoregion. It comprises 5,000 ha destined to conserve, since 2009, native vegetation and fauna of Campos y Malezales. It is located close to the Selva Paranaense ecoregion, and even though it possesses the typical vegetation of Campos y Malezales, it could be considered as part of the ecotone between the two regions (Matteucci, 2012; Bauni & Homberg, 2015).

4. Área de recursos ambientales Zaimán (Ara Zaimán), Posadas. Urban reserve since 2011 with an area of 60 ha in the Zaimán stream basin. In spite of still being an impacted area, the landscape presents patches with native species, small portions of canopy forests and grasslands with native flora, which is currently under study.

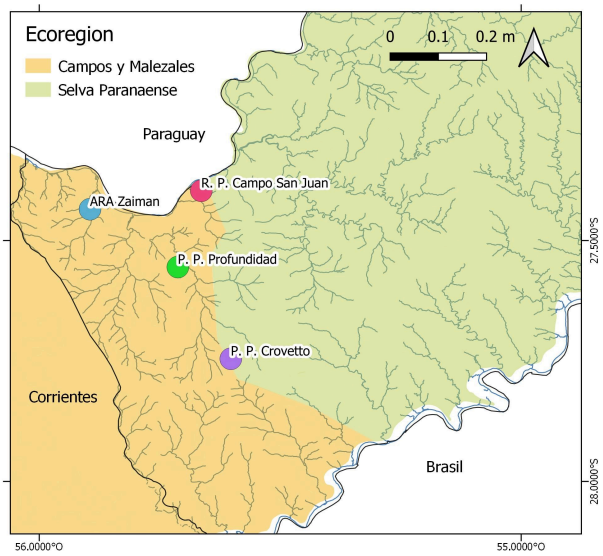

Fig. 1. Reserves selected in Campos y Malezales Ecoregion in Misiones Argentina.

Reserves	Stream coordinates	Collection dates			
		Spring	Summer	Spring	Summer
Parque Provincial de las Sierras Crovetto	55°34'3.87"W 27°44'36.78"S	05/11/16	27/02/17	29/11/17	07/02/18
Parque Provincial Cañadón de Profundidad	55°42'38.31"W 27°33'31.31"S	06/11/16	25/02/17	22/11/17	07/02/18
Reserva privada Campo San Juan	55°38'34.77"W 27°22'46.10"S	23/11/16	03/03/17	27/11/17	26/02/18
Área de recursos ambientales Zaiman	55° 54' 1.16"W 27° 26' 3.28"S	10/11/14	15/03/15	15/12/15	18/03/16

Table I. Sites geographic location and collection schedule.

Species survey

We conducted four surveys on each reserve, between 2014 and 2018, during spring and summer, between 9 and 16 h (Table I). The Odonata were

collected with aerial nets, at each site, along 10 transects (10 m x 1 m) parallel to the riverbank (Smith et al., 2007). The specimens were fixed with ethanol 96% and dried for later identification with the available keys (*e.g.*, Garrison et al., 2006; von Ellenrieder & Garrison, 2007; Pessacq & Costa, 2007; Garrison et al., 2010). Some specimens could not be identified at a specific level, because they were not collected but identified on sight in the field (*e.g.*, *Mecistogaster* Rambur) or due to difficulties in the specific identification such as genera of complex taxonomy and/or absence of updated keys (*e.g.*, *Progomphus* Selys, *Brechmorhoga* Kirby), or damaged diagnostic structures. Those specimens were included as "sp." in Table II. The preserved organisms are deposited in Centro de Investigaciones Entomológicas de Posadas, Misiones. Systematic classification follows Dijkstra et al. (2013, 2014).

RESULTS

Specimens of six families and 28 genera of Odonata were collected, with a total number of 36 species and eight morphotypes identified in the four reserves (Table II). Libellulidae is the family with the highest number of species recorded (22 species) followed by Coenagrionidae (15 species). Two species were recorded for first time, one in Argentina: *Minagrion waltheri* Selys (Coenagrionidae), and one in Misiones province: *Tholymis citrina* Hagen (Libellulidae).

Species	Reserves	Species	Reserves
Anisoptera		**Libellulidae (cont.)**	
Aeshnidae		*Perithemis mooma* Kirby, 1889	3,4
Castoraeschna januaria (Hagen, 1867)	1-3	*Tholymis citrina* Hagen, 1867 ([a])	4
Limnetron antarcticum Förster, 1907	4	*Zenithoptera lanei* Santos, 1941	4
Gomphidae		**Zygoptera**	
Progomphus sp.1	2	**Calopterygidae**	
Tibiagomphus uncatus (Fraser, 1947)	1	*Hetaerina rosea* Selys, 1853	1-4
Libellulidae		*Hetaerina* sp. 1	1
Brechmorhoga sp.1	1-3	*Mnesarete pruinosa* (Hagen in Selys, 1853)	1
Dasythemis venosa (Burmeister, 1839)	4	**Coenagrionidae**	
Diastatops sp.1	4	*Acanthagrion aepiolum* Tennessen, 2004	2-4
Erythemis sp.1	3-4	*Acanthagrion cuyabae* Calvert, 1909	4
Erythrodiplax atroterminata Ris, 1911	1,3,4	*Acanthagrion gracile* (Rambur, 1842)	3-4
Erythrodiplax basalis (Kirby, 1897)	4	*Acanthagrion lancea* Selys 1876	4
Erythrodiplax fusca (Rambur, 1842)	2-4	*Argentagrion ambiguum* (Ris, 1904)	4
Erythrodiplax latimaculata Ris, 1911	4	*Argia albistigma* Hagen in Selys, 1865	1-3
Erythrodiplax media Borror, 1942	1,3,4	*Argia croceipennis* Selys, 1865	1-3
Erythrodiplax melanorubra Borror, 1942	3	*Argia mollis* Hagen in Selys, 1865	3
Erythrodiplax nigricans (Rambur, 1842)	4	*Argia serva* Hagen in Selys, 1865	2,4
Erythrodiplax ochracea (Burmeister, 1839)	4	*Mecistogaster* sp. 1	2
Erythrodiplax paraguayensis (Förster, 1905)	4	*Minagrion waltheri* Selys, 1876 ([b])	4
Erythrodiplax umbrata (Linnaeus, 1758)	4	*Neoneura sylvatica* Hagen in Selys, 1886	2,3
Macrothemis sp.1	2,4	*Oxyagrion basale* Selys, 1876	2
Miathyria marcella (Selys in Sagra, 1857)	4	*Peristicta aeneoviridis* Calvert, 1909	1-3
Micrathyria pseudeximia Westfall, 1992	1,2,4	*Telagrion longum* Selys, 1876	2
Micrathyria sp.1	1	**Heteragrionidae**	
Nephepeltia berlai Santos, 1950	4	*Heteragrion aurantiacum* Selys, 1862	1-3

Table II. Species recorded in each site. ([a]) New distribution record for Misiones province, ([b]) new distribution record for Argentina. 1) Parque Provincial Crovetto, 2) Parque Provincial Cañadón de Profundidad, 3) Reserva privada Campo San Juan, 4) Área de recursos ambientales Zaimán.

DISCUSSION

We presented a list of Odonata species for four reserves that protect Campos y Malezales ecoregion in Misiones. It represents 22% of the species cited in the province, in addition to new distributions records. Until the updated checklist recently published (Lozano et al., 2020), no species list has been developed specifically for this ecoregion, besides an inventory in one site of Corrientes province included within the Iberá wetlands area of influence (Muzón et al., 2008). Our work represents the first checklist of Odonata species for Campos y Malezales ecoregion of Misiones province. Despite the small area studied, we were able to detect two species that were not yet recorded in the region. One of them, *M. waltheri*, is collected for the first time in Argentina. The closest known record of this species (Dalzochio et al., 2018) is from the Pampa biome, in Rio Grande do Sul, a Brazilian state adjacent to our study site. *Tholymis citrina*, on the other hand, is known to be present in Santa Fe, Jujuy, Tucuman and Salta provinces (Lozano et al., 2020), so we have extended its distribution. Four species that were recently cited (Lozano et al., 2020) in the area were also collected: *Telagrion longum* Selys, *Micrathyria pseudeximia* Westfall, *Nephepeltia berlai* Santos, and *Argentagrion ambiguum* (Ris). This highlights the poor knowledge of the area and the example of the dragonflies could be very likely extended to other insect orders. This also shows the need of deeper studies in this area in order to understand and record its diversity and to dimension the importance of protecting the ecoregion.

Having information regarding the distribution and ecology of these organisms is essential to develop efficient conservation strategies. However, knowledge of this order in the province still requires further field work, mainly in the poorly surveyed Campos y Malezales ecoregion. Considering that some Odonata families remain poorly sampled, and that this study was centered on lotic environments, unregistered species are still likely to be found.

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LITERATURE CITED

Bauni, V. & Homberg, M.A. (2015)*Reserva Natural Campo San Juan. 1a ed*. Fundación de Historia Natural Félix de Azara, Buenos Aires.

Cabrera, A.L. (1994) *Regiones Fitogeográficas Argentinas. Enciclopedia Argentina de Agricultura y Jardinería*. ACME S.A.C.I., Buenos Aires, Argentina.

Chebez, J.C. (2005) *Nordeste Guía de Reservas Naturales de La Argentina*. Albatros, Buenos Aires.

Dalzochio, M.S., Renner, S., Sganzerla, C., Prass, G., Ely, G.J., Salvi, L.C., Dametto, N., & Périco, E. (2018) Checklist of Odonata (Insecta) in the state of Rio Grande do Sul, Brazil with seven new records. *Biota Neotropica*, **18(4)**, e20180551.

Dijkstra, K.D.B., Bechly, G., Bybee, S.M., Dow, R.A., Dumont, H.J., Fleck, G., Garrison, R.W., Hämaläinen, M., Kalkman, V.J., et al. (2013) The classification and diversity of dragonflies and damselflies (Odonata)*. **Zootaxa**, **3703**, 36-45.

Dijkstra, K.B., Kalkman, V.J., Dow, R.A., Stokvis, F.R., & van Tol, J. (2014) Redefining the damselfly families a comprehensive molecular phylogeny of Zygoptera. *Systematic Entomology,* **39**, 68-96.

Garrison, R.W., von Ellenrieder, N., & Louton, L.J.A. (2006) *Dragonfly Genera of the New World: An illustrated and annotated key to the Anisoptera.* The Johns Hopkins University Press, Baltimore.

Garrison, R.W., von Ellenrieder, N., & Louton, L.J.A. (2010) *Damselfly Genera of the New world: An Illustrated and Annotated Key to the Zygoptera.* The Johns Hopkins University Press, Baltimore, Maryland.

Lozano, F., del Palacio, A., Ramos, L., & Muzón, J. (2020) The Odonata of Argentina: state of knowledge and updated cheklist. *International Journal of Odonatology*, **23(2),** 113-153.

Matteucci, S.D. (2012) Ecorregión Campos y Malezales. *Ecorregiones y Complejos Ecosistémicos Argentinos. Primera edición.* (ed. Morello, J., Matteucci, S.D., Rodriguez, A., & Silva, M.). pp. 247-263. Orientación Gráfica Editora S.R.L., Buenos Aires.

Muzón, J., von Ellenrrieder, N., Pessacq, P., Lozano, F., Garré, A., Lambruschini, J., Ramos, L., & Weigel Muñoz, M.S. (2008) Odonata from Iberá Wetlands (Corrientes, Argentina): preliminary inventory and biodiversity. *Revista de la Sociedad Entomológica Argentina*, **67(1-2)**, 59-67.

Pessacq, P., & Costa, J.M. (2007) Three new species of *Peristicta* Hagen in Selys (Odonata: Zygoptera: Protoneuridae) from Brazil. *Neotropical Entomology*, **36**, 46-52.

Renner, S., Périco, E., Ely, G.J., & Sahlén, G. (2017) Preliminary dragonfly (Odonata) species list from the Pampa biome in Rio Grande do Sul, Brazil, with ecological notes for 19 new records for the State. *Biota Neotropica*, **17(4)**, e20170374.

Smith, J., Samways, M.J., & Taylor, S. (2007) Assessing riparian quality using two complementary sets of bioindicators. *Biodiversity and Conservation*, **16(9)**, 2695-2713.

von Ellenrieder, N., & Garrison, R.W. (2007) Dragonflies and Damselflies (Insecta: Odonata) of the Argentine Yungas: Species composition and identification. *Scientific Reports, Società Zoologica 'La Torbiera'*, **7**, 1-13.