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ARTICLE

Odonate Communities of the Sucupira Reservoir, Rio Uberabinha, Minas Gerais, Brazil

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Abstract. Dragonflies and damselflies (Insecta: Odonata) are widely distributed among freshwater ecosystems of tropical and temperate environments. They are also particularly sensitive to anthropogenic changes. The objective of this study was to inventory the odonate fauna of a section of the Sucupira Reservoir on Rio Uberabinha, Uberlândia, Minas Gerais, Brazil, and to document the species composition of the odonate fauna during the dry and rainy seasons. The study also aimed to describe the distribution of the sampled species in Brazilian states. Sampling took place in August and September of 2017 (dry season) and in February and March of 2018 (rainy season), and recorded 860 individuals of 43 species belonging to 26 genera and six families. Six new records representing the families Gomphidae, Libellulidae and Coenagrionidae were recorded for the state of Minas Gerais. Seventeen species were collected only during the rainy season and eight only during the dry season, while 18 species were found in both seasons. The rainy season had greater abundance, with four times as many individuals as the dry season. This study increases the number of records for Odonata in the Minas Gerais state, and reinforces the trend for greater predominance of this group during the rainy season in this biome.

Key-Words. Cerrado; Inventory; Damselfly; Dragonfly; Odonata.

INTRODUCTION

A total of 854 species of 146 genera of dragonflies (Odonata: Insecta) has been estimated to occur in Brazil (Pinto, 2018), which is considered the greatest number of species for any country in the Neotropical Region (von Ellenrieder, 2009). Despite the existence of numerous studies on odonates in Brazil, the diversity of some areas remains poorly-known. For example, there have only been a few sporadic odonate collections made in the Northeast Region of the country (De Marco & Vianna, 2005). A total of 218 species of odonates was estimated for the state of Minas Gerais in Southeast Brazil in 1998 (Machado, 1998). Since then, however, 26 new odonate species have been described for state, increasing the total number of recorded species to at least 244 (Machado, 2000, 2002, 2005a, 2005b, 2006, 2007a, 2007b, 2010, 2015; Costa *et al.,* 2000b; Tennessen, 2004; Garrison, 2006; Machado & Bedê, 2006; Pessacq & Costa, 2007; Costa *et al.,* 2009; Santos *et al.,* 2010; Machado & de Souza, 2014; Machado & Bedê, 2015; Guillermo-Ferreira *et al.,* 2016; Pinto & Almeida, 2016; Ávila-Júnior *et al.,* 2017).

Many studies of odonates in Minas Gerais have been carried out in the central and southern regions of the state (Souza *et al.,* 2013; Almeida *et al.,* 2013; Bedê *et al.,* 2015), while other areas remain poorly sampled. For example, little is known about the odonate fauna of the Triângulo Mineiro Region in western Minas Gerais (*e.g.,* Borges *et al.,* 2019). This region should be considered a priority area for faunal surveys of odonates (De Marco & Vianna, 2005) since rapid growth of agriculture has led to the loss of natural habitats (Lima, 1996).

Studies have shown that environmental alterations due to agricultural activities near watercourses can affect odonate biodiversity. This is because agriculture can have indirect negative effects on aquatic habitats, which are essential for

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the completion of the odonate life cycle, thus favoring a limited number of generalist species (Juen *et al.,* 2014; Oliveira-Júnior *et al.,* 2017). In addition, seasonality can have a temporal effect on diversity by altering aquatic invertebrate communities among seasons, especially since aquatic environments are particularly susceptible to seasonal changes (Bischof *et al.,* 2013; Dijkstra *et al.,* 2014).

There can be a lack of rainfall for a period of up to six months during the dry season of the Cerrado, which decreases the depth of water in rivers. The first rains after this period are incorporated by the hydromorphic soil of this biome, which is associated with underground basins, flooded areas and rivers (Fonseca, 2005). Therefore, seasonality can play an important role in odonate development, mainly due to changes in habitat and food availability (Corbet, 1999).

Considering the scarcity of information on the distribution of odonates in the Triângulo Mineiro Region, and the extension of agricultural landscapes therein (Lima, 1996; Silva, 2000), the main objective of the present study was to inventory the odonate fauna of a stretch of the Sucupira Reservoir on the Rio Uberabinha, Uberlândia, Minas Gerais, Brazil. This study also sought to: (1) evaluate the distribution of the sampled species in Brazil; and (2) document the species composition of the odonate fauna during the dry and rainy seasons.

MATERIAL AND METHODS

Sampling area

The study was carried out on 105.7 hectares of privately owned property on the banks of the Sucupira Reservoir of Rio Uberabinha (18°59'16.8"S and 48°08'47.3"W), located near (~19 km) the urban perimeter of the municipality of Uberlândia in Triângulo Mineiro, Minas Gerais (Fig. 1). Rio Uberabinha originates in the municipality of Uberaba, crosses the municipalities of Uberlândia and Tupaciguara, and then empties into Rio Araguari for a total length of 123 km. The urban area of Uberlândia is supplied by two water catchment systems: Cachoeira do Sucupira (southeast zone of the city) and Bom Jardim (south zone of the city) (CONAMA, 2005, 2011). Different classes of water quality occur along the length of Rio Uberabinha, but CONAMA № 357 of 17 March 2005, as amended by Resolution № 430 of 13 May 2011, classifies the water as Class 3 – water that can be used for: supplying human consumption after conventional or advanced treatment; irrigating tree, cereal and forage crops; amateur fishing; secondary contact recreation; and watering cattle – which may explain the intense anthropic occupation of the area (CONAMA, 2005, 2011).

The Triângulo Mineiro Region is largely occupied by agricultural activities, which have intensified over the

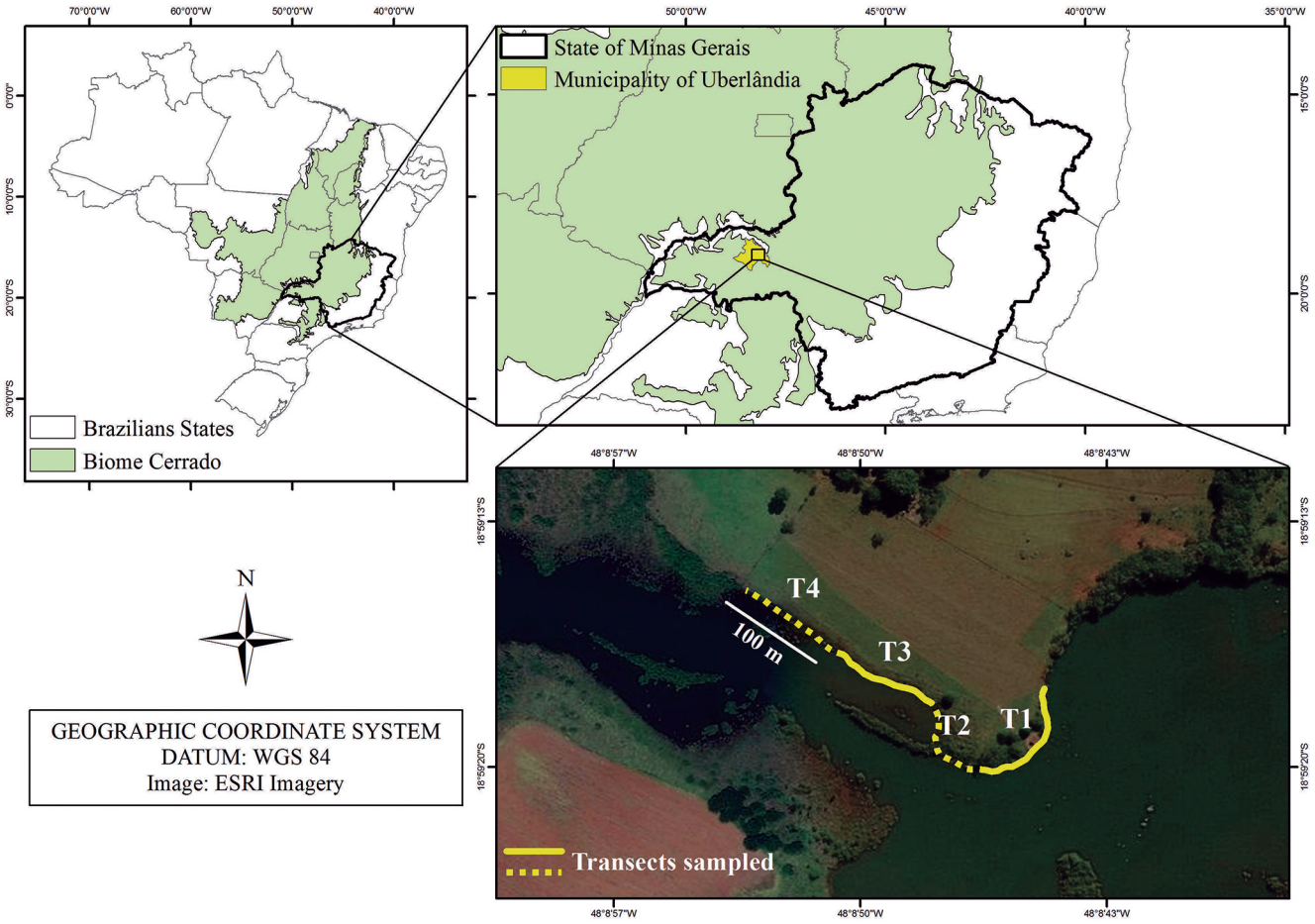

Figure 1. Map of the study area showing the collection sections/transects (T1, T2, T3, T4) and the watercourse of Rio Uberabinha, Uberlândia, Minas Gerais.

last 50 years (Silva, 2000) resulting in a rapid reduction of natural areas (Lima, 1996). Most of the areas surrounding the study site possess a predominance of annual crops (corn, sunflower and soybean) and livestock activities, with few preserved areas. The section of Rio Uberabinha that passes through the study property, including the sampled area, is characterized as predominantly lentic, although the river below the reservoir is lotic. The analyzed sections possess a predominance of open areas with sparse shrubs and few trees. Like many areas of the Cerrado, the region experiences a seasonal climate, classified as Aw by the Köppen classification, with a hot and humid rainy season (October to March) and a cooler dry season (April to September). The mean annual temperature is 23°C, while the mean annual precipitation is 1,350 mm, with more than 80% of the rainfall being concentrated in the rainy season between November and March (Silva, 2000).

Sampling and species identification

Adult dragonflies were collected in four sections of the study property in August and September of 2017 (dry season) and in February and March of 2018 (rainy season). Sampling was performed during the daytime – between 10:00 h and 15:00 h, with a break from 12:00 h to 13:00 h – with a sampling effort of one hour per transect. The collection schedule was established based on studies that have shown the highest occurrence of odonates during the hotter periods of the day (Corbet, 1999; Hassall & Thompson, 2008). Transects were established along four 100-meter stretches of the river around the reservoir, in places where it was possible for two collectors to operate (Fig. 1).

Adults were collected using entomological nets ("puçá" or long-handed hoop-net), with a 35-cm diameter hoop and a 60-cm deep funnel. Samples were taken to the laboratory where they were kept in a freezer at -15°C for three hours, after which they were immersed in acetone solution for a period of 8 to 16 hours (depending on specimen size) to dissolve fats and preserve color (O'Brien, 1997). The specimens were then dehydrated in an oven at 30°C for four hours. The specimens were ultimately identified to species with the aid of taxonomic keys (Lencioni, 2005, 2006, 2017; Garrison *et al.,* 2006, 2010), and deposited in the Coleção Entomológica do Laboratório de Ecologia-Evolução da Biodiversidade, of the Universidade Federal de Uberlândia, Minas Gerais, Brazil. The collection license was granted by IBAMA through SISBIO under the number 28398-1.

Statistical analysis

The non-parametric Chao 1 estimator was used to estimate dragonfly richness for the study area and for each season separately. The estimator and rarefaction curves were obtained using EstimateS statistical program (Colwell, 2009), with 1000 replicates.

RESULTS

A total of 860 individuals of 43 species distributed among 26 genera and six families were collected (Table 1). Some sampled species of the families Gomphidae, Libellulidae, Coenagrionidae and Calopterygidae are illustrated in Fig. 2. The rarefaction curve based on the sampling data of both seasons displays the sampling effectiveness for the study (Fig. 3). The richness of species collected corresponds to 71.3% of the mean estimated richness for the area by Chao 1 (59.9 ± 11.9) (Fig. 3). The richness of species collected during the dry season (26) corresponds to 80.6% of the mean estimated richness (31.0 ± 6.4), while that collected during the rainy season (35), corresponds to 76.1% of the mean estimated richness (64.24 ± 12.24) (Fig. 4A).

The number of species collected in the rainy season was 1.35 times that collected in the dry season, and with, on average, four times more individuals. Two rarefaction curves showing the effectiveness of the sampling effort in each season can be seen in Fig. 4A. The Venn diagram shows that 41.86% of the species were common to both seasons. A total of 35 species were collected during the rainy season, 17 of which were only collected then (~40% of all species found), while a total of 25 species were collected during the dry season, eight of which were collected only then (~19% of all species found) (Fig. 4B).

DISCUSSION

The number of studies involving odonates in Brazil has been increasing over the last several years, with many of them involving ecology and taxonomy (Miguel *et al.,* 2017). Ângelo Machado has made numerous contributions regarding odonates in many areas of Minas Gerais, including new findings and taxonomic descriptions of several species (see References for a list of new odonate species described by Machado from Minas Gerais since 1998). Other lists for different regions and biomes of the state have since been produced (Souza *et al.,* 2013; Almeida *et al.,* 2013; Bedê *et al.,* 2015; Souza *et al.,* 2017). Nonetheless, information regarding odonates is still lacking for Triângulo Mineiro, a region in the Cerrado biome, which is a world biodiversity hotspot (Myers *et al.,* 2000). This lack of information is unsettling given the extensive occupation by livestock and farming activities (Silva, 2000). The present study contributed six new odonate records for the state, with species belonging to the families Coenagrionidae, Gomphidae and Libellulidae. These results demonstrate the need for more studies to better understand the distribution of these insects in this region.

Reported values for odonate species richness in the Cerrado biome range from 26 to 85 (Ferreira-Peruquetti & Fonseca-Gessner, 2003; Almeida *et al.,* 2013; Calvão *et al.,* 2014; Dutra & De Marco, 2015; Vilela *et al.,* 2016; Souza *et al.,* 2017; Klein *et al.,* 2018; Borges *et al.,* 2019). Considering that studies reporting higher species richness in the Cerrado were done at larger sites with larger

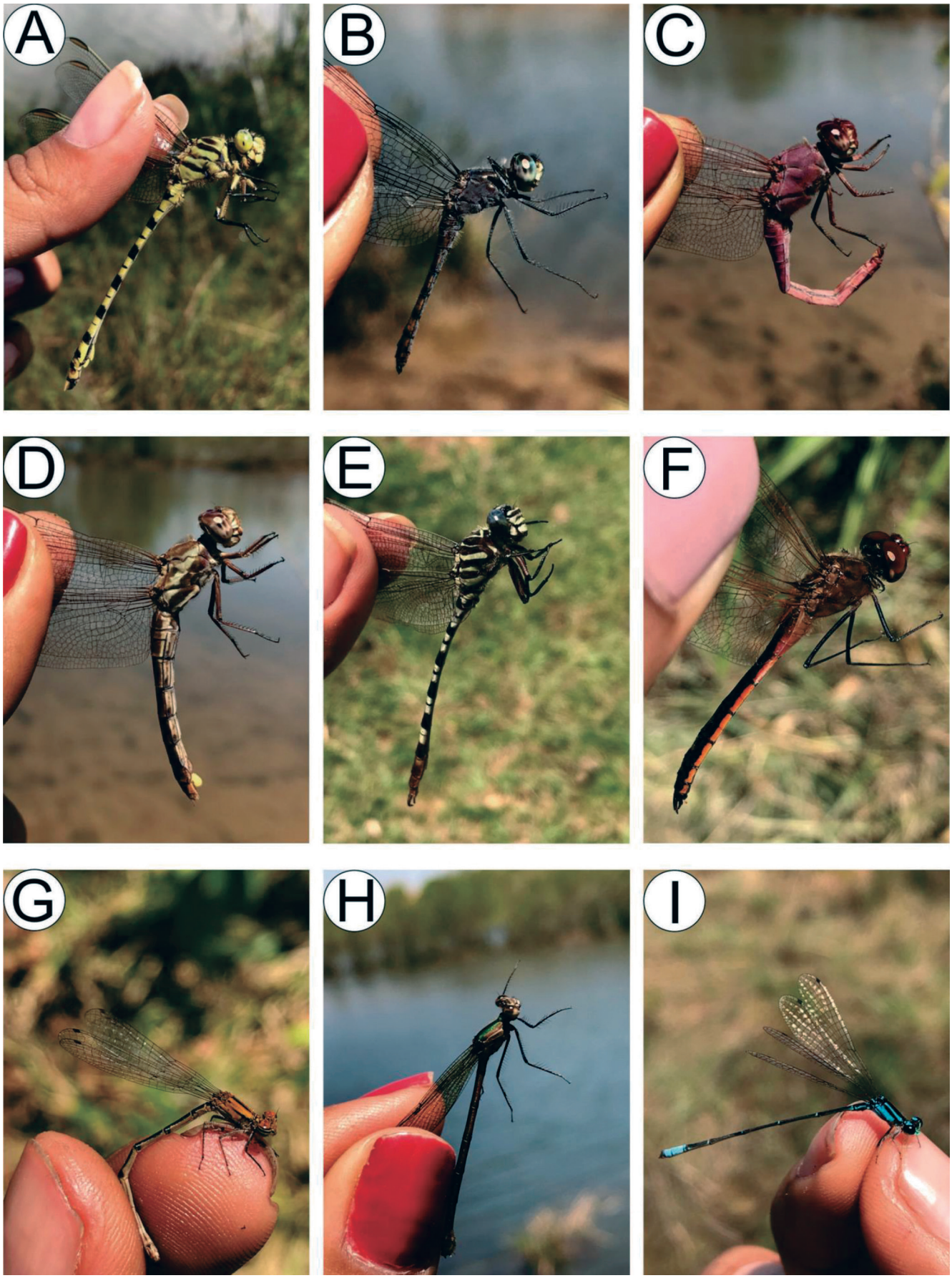

Figure 2. Odonate species sampled in the study area. (A) *Aphylla distinguenda* – Male (Gomphidae), (B) *Oligoclada stenoptera* – Male (Libellulidae), (C) *Orthemis discolor* – Male (Libellulidae), (D) *Orthemis aequilibris* – Female (Libellulidae), (E) *Phyllocycla gladiata* – Male (Gomphidae), (F) *Idiataphe longipes* – Young male (Libellulidae), (G) *Tigriagrion aurantinigrum* – Female (Coenagrionidae), (H) *Hetaerina rosea* – Female (Calopterygidae) and (I) *Acanthagrion gracile* – Male (Coenagrionidae).

Table 1. List of odonate species collected in the Sucupira Reservoir in Uberlândia, Minas Gerais, Brazil, with seasonality, abundance, code, distribution among Brazilian states (UF) and references. The references display on the list was based on Calvão *et al.* 2014. * New records for the state of Minas Gerais. ** Collected in the municipalities of Ituiutaba and Unaí (Personal data, D.S. Vilela). Individuals identified to genus are females that could not be associated with any species. Acronyms for Brazilian states: AM = Amazonas; BA = Bahia; CE = Ceará; ES = Espírito Santo; GO = Goiás; MA = Maranhão; MT = Mato Grosso; MS = Mato Grosso do Sul; MG = Minas Gerais; PA = Pará; PB = Paraíba; PR = Paraná; PE = Pernambuco; PI = Piauí; RJ = Rio de Janeiro; RN = Rio Grande do Norte; RS = Rio Grande do Sul; RO = Rondônia; RR = Roraima; SC = Santa Catarina; SP = São Paulo and TO = Tocantins.

Species	Dry	Rainy	Abundance	Code	Distribution (UF)	References
ANISOPTERA						
Gomphidae						
Aphylla distinguenda (Campion, 1920)*		X	1	UB2018001	MT, PR, SC, RS	3, 4
Archaeogomphus infans (Ris, 1913)	X	X	14	UB2018002	RJ, BA, ES, SP, MG	10, 15, 38
Gomphoides perdita (Förster, 1914)*		X	1	UB2018003	PR	5
Phyllocycla gladiata (Hagen in Selys, 1854)*		X	4	UB2018004	RJ, PE	10, 15
Libellulidae						
Oligoclada sp.	X	X	13	UB2018005	—	—
Brachymesia herbida (Gundlach, 1889)*		X	1	UB2018006	MS, RJ, CE, SP, MT	10, 11, 14, 15, 31, 36
Diastatops obscura (Fabricius, 1775)		X	1	UB2018007	MG, PA, RR, MA, BA, MT, MS, ES, SP, RJ, TO, RN, PE, RS, CE, GO	8, 9, 10, 11, 14, 15, 16, 17, 21, 23, 24, 25, 29, 35, 36, 37
Erythrodiplax castanea (Burmeister, 1839)	X	X	117	UB2018008	MG, MS, SP, CE, GO, PA, AM, PE, MT, RO, BA, ES, RJ, SC	11, 13, 15, 31, 32, 36
Erythrodiplax fusca (Rambur, 1842)	X	X	44	UB2018009	MG, RS, MT, AM, PA, RO, RN, BA, ES, SP, RJ, GO, CE, MS, SC	9, 11, 13, 14, 15, 16, 17, 18, 22, 23, 24, 25, 33, 35, 36
Erythrodiplax juliana Ris, 1911	X		1	UB2018010	MG, AM, RJ, ES, TO, SP, MT, MS, GO	9, 10, 11, 13, 15, 16, 17, 23, 35
Erythrodiplax latimaculata Ris, 1911	X	X	99	UB20180011	MG, BA, RJ, SP, AM, MT, MS, CE, GO	11, 13, 14, 15, 16, 17, 23, 35, 36
Erythrodiplax umbrata (Linnaeus, 1758)		X	12	UB20180012	MG, RR, MS, RJ, CE, SP, BA, AM, MT, RO, ES, PA, RS	2, 9, 10, 11, 14, 15, 16, 18, 21, 22, 23, 31, 34, 36, 38
Idiataphe amazonica (Kirby, 1889)	X	X	3	UB20180013	MG, MS, CE, SP, BA, MT, AM, PA	11, 15, 16, 23, 31, 36
Macrothemis imitans Karsch, 1890	X	X	6	UB20180014	MG, PR, RJ, SP, MS, BA, MT, ES, SC, RS, MT	1, 11, 12, 14, 15, 18, 23, 29, 31, 34, 35, 36
Micrathyria hesperis Ris, 1911		X	2	UB20180015	MG, PA, PI, CE, PE, BA, ES, RJ, SP, PR, SC, RS, GO, MT, MS	2, 10, 11, 15, 18, 29, 31, 33, 36, 37
Micrathyria spuria (Selys, 1900)		X	1	UB20180016	MG, PR, RR, RJ, SP, MT, MS, RS	2, 8, 9, 11, 15, 29, 31
Oligoclada abbreviata (Rambur, 1842)		X	11	UB20180017	MG, AM, RO, PA, RR, SP, RJ, ES, BA, PE, MT	9, 11, 15, 16, 21, 23, 25
Oligoclada crocogaster Borror, 1931		X	1	UB20180018	MG**, MS, PA, RO	15, 25, 31
Oligoclada stenoptera Borror, 1931*	X	X	43	UB20180019	RO	6
Orthemis aequilibris Calvert, 1909	X		3	UB20180020	MG, MS, AM, RS	28, 29, 36, 38
Orthemis discolor (Burmeister, 1839)	X	X	16	UB20180021	MG, RS, RJ, ES, MA, PR, SP, MT, MS, GO, BA, AM	9, 11, 13, 14, 15, 16, 18, 22, 23, 29, 31, 33, 37
Pantala flavescens (Fabricius, 1798)	X	X	2	UB20180022	MG, RS, RR, MS, RJ, CE, SP, BA	1, 2, 10, 11, 18, 21, 27, 29, 31, 34, 35, 36, 37
Tramea binotata (Rambur, 1842)	X		1	UB20180023	MG, MS, SP, RJ, RS, MS	2, 10, 11, 14, 15, 29, 31
ZYGOPTERA						
Calopterygidae						
Hetaerina rosea Selys, 1853		X	1	UB20180024	MG, RO, ES, RJ, SP, MT, MS, BA, RS, CE, GO	1, 2, 8, 9, 11, 13, 14, 16, 17, 18, 20, 23, 27, 28, 29, 31, 33, 34, 35, 36, 37
Coenagrionidae						
Argia sp.		X	1	UB20180025	—	—
Epipleoneura sp.		X	1	UB20180026	—	—
Acanthagrion aepiolum Tennessen, 2004	X	X	95	UB20180027	MG, MS, RO, SP, AM, PA	2, 12, 13, 17, 20, 25, 30, 31
Acanthagrion gracile (Rambur, 1842)	X		2	UB20180028	MG, RS, BA, ES, SP, GO, AM, RJ, RS, MS, MT, CE	7, 10, 11, 13, 14, 17, 18, 20, 29, 33, 36
Acanthagrion lancea Selys, 1876	X	X	8	UB20180029	MG, RS, MS, SP, GO, ES, RJ, SC	14, 20, 29, 33
Acanthagrion truncatum Selys, 1876	X	X	128	UB20180030	MG, MT, SP, TO, MS, GO, AM	13, 14, 16, 17, 20, 23

Species	Dry	Rainy	Abundance	Code	Distribution (UF)	References
Argia reclusa Selys, 1865		X	6	UB20180031	MG, MS, CE, SP, AM, PA, MT, RS	1, 2, 7, 9, 11, 13, 14, 16, 20, 23, 25, 31, 36, 37
Cyanallagma angelae Lencioni, 2001*	X		1	UB20180032	SP	20
Cyanallagma nigrinuchale (Selys, 1876)	X		2	UB20180033	MG, MS, SP	2, 11, 14, 20, 31, 33, 37
Epipleoneura venezuelensis Rácenis, 1955	X	X	17	UB20180034	MG, MS, SP, RO, MT, GO, RJ, PR	11, 12, 16, 20, 23, 30, 31, 33, 34, 35
Epipleoneura williamsoni Santos, 1957		X	2	UB20180035	MG, SP, AM, MT, GO, TO, BA	7, 11, 13, 16, 17, 20, 23, 37
Homeoura chelifera (Selys, 1876)	X	X	37	UB20180036	MG, RS, MS, SP, RJ, BA, ES, PR, SC	2, 10, 11, 12, 14, 18, 20, 29, 31, 33
Homeoura lindneri (Ris, 1928)	X	X	17	UB20180037	MG, SP	14, 20, 33
Ischnura fluviatilis Selys, 1876	X	X	45	UB20180038	MG, RS, PA, ES, MA, RJ, SP, RS, MT, MS, CE, AM	2, 8, 10, 11, 13, 18, 20, 27, 28, 29, 31, 36
Nehalennia minuta (Selys in Sagra, 1857)	X		3	UB20180039	MG, SP, MA, BA	11, 20
Neoneura sylvatica Hagen in Selys, 1886		X	16	UB20180040	MG, BA, RJ, SP, RO, TO, MS, MT, AM, GO	2, 8, 9, 13, 16, 17, 19, 21, 23, 33, 35, 37
Telebasis coccinea (Selys, 1876)		X	1	UB20180041	MG, BA, TO, MT, GO, AM	5, 7, 8, 13, 16, 19, 23
Tigriagrion aurantinigrum Calvert, 1909	X	X	74	UB20180042	MG, MT, SP, MS, PA, GO	2, 7, 8, 11, 14, 16, 17, 18, 20, 21, 23, 25, 33, 36, 37
Lestidae						
Lestes minutus Selys, 1862	X		3	UB20180043	MG, RR, MT, SP	20, 35

References: (1) Almeida *et al.*, 2013; (2) Bedê *et al.*, 2015; (3) Belle, 1992; (4) Belle, 1994; (5) Belle, 1995; (6) Borror, 1931; (7) Brasil *et al.*, 2014; (8) Calvão *et al.*, 2014; (9) Carvalho *et al.*, 2013; (10) Carvalho & Nessimian, 1998; (11) Costa *et al.*, 2000a; (12) Dalzochio *et al.*, 2011; (13) Dutra & De Marco, 2015; (14) Ferreira-Peruquetti & Fonseca-Gessner, 2003; (15) Heckman, 2006; (16) Juen *et al.*, 2014; (17) Klein *et al.*, 2018; (18) Koroiva *et al.*, 2017; (19) Lencioni, 2005; (20) Lencioni, 2017; (21) Machado *et al.*, 1991; (22) Monteiro-Júnior *et al.*, 2014; (23) Oliveira-Júnior *et al.*, 2013; (24) Oliveira-Júnior *et al.*, 2015; (25) Oliveira-Júnior *et al.*, 2017; (26) Pires *et al.*, 2013; (27) Renner *et al.*, 2015; (28) Renner *et al.*, 2016; (29) Renner *et al.*, 2017; (30) Rodrigues *et al.*, 2016; (31) Rodrigues & Roque, 2017; (32) Santos, 1966; (33) Silva *et al.*, 2010; (34) Souza *et al.*, 2013; (35) Souza *et al.*, 2017; (36) Takiya *et al.*, 2016; (37) Vilela *et al.*, 2016; (38) von Ellenrieder, 2009.

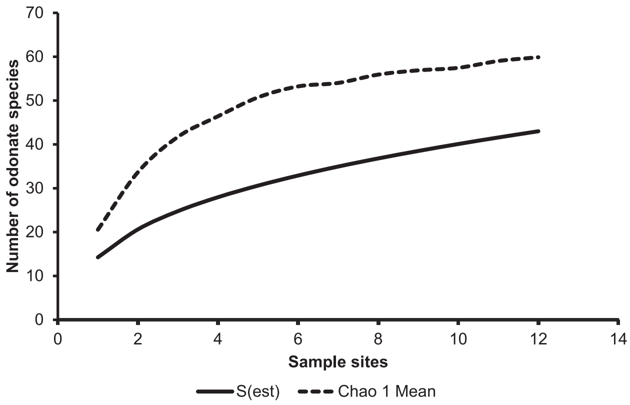

Figure 3. Odonate species rarefaction curve and the number of species estimated by the Chao 1 estimator during the rainy and dry seasons in the study area in Uberlândia, Minas Gerais.

proportions of preserved areas, the richness found by the present study (43 species) can be considered average, even given its relatively small and highly-degraded area. This result may be due, in part, to the large sampling effort of the present study, which resulted in sampling 72.9% of the species richness estimated by the Chao 1 estimator (Chao, 1984, 1987).

A study performed in Reserva Ecológica do Clube Caça e Pesca Itororó de Uberlândia, in the municipality of Uberlândia, which encompasses 640 ha (Vilela *et al.,* 2016), encountered 31 species along a 500 meter section of the stream and pond of the reserve, which is a relatively low number compared to other such studies in the Cerrado biome. Nonetheless, a new species of the family Libellulidae was found at this site: *Erythrodiplax ana* Guillermo-Ferreira & Vilela, 2016 (Guillermo-Ferreira *et al.,* 2016). A new species was also found by a recent study at Fazenda Nova Monte Carmelo in the Triângulo Mineiro Region; a species of the genus *Tigriagrion* (Coenagrionidae), which is currently being described (Borges *et al.,* 2019). These data suggest that this relatively unexplored area of the Cerrado is likely to possess yet additional new odonate species.

The present study recorded species that are rarely sampled in inventories, such as *Cyanallagma angelae* Lencioni, 2001; *Cyanallagma nigrinuchale* Selys, 1876; *Homeoura lindneri* Ris, 1928; *Lestes minutus* Selys, 1862; *Nehalennia minuta* Kirby, 1890; and *Phyllocycla gladiata* Selys, 1854, suggesting that the surroundings of Rio Uberabinha, as well as other areas of the Triângulo Mineiro Region, still have the potential for the existence of species that have limited distributions, despite it being degraded (see Table 1). Furthermore, some areas are important for conserving odonate diversity, and thus should be prioritized for the preservation of these insects (Borges *et al.,* 2019).

The species of the family Gomphidae are known to secretive, many of which are also evasive, thus making them difficult to collect by the traditional method of entomological nets (Almeida *et al.,* 2013). This may explain why few individuals of this family are sampled by inventories, and why three of four species of Gomphidae collected in the present study were new records for Minas

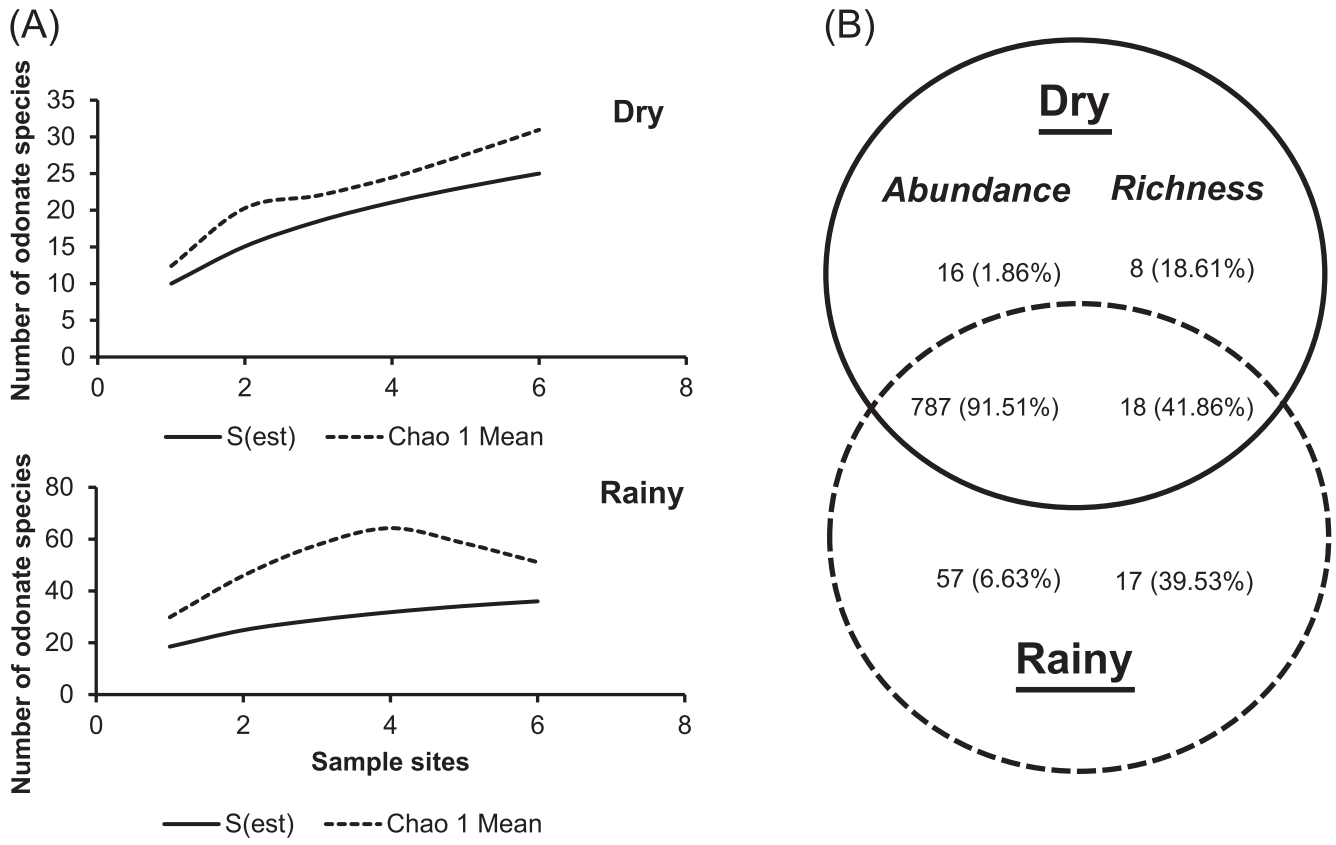

Figure 4. Comparison of species richness and abundance between rainy and dry seasons in the Sucupira Reservoir: (A) Odonate species rarefaction curves in each season. (B) Venn diagram showing the distribution of species between the seasons including the percentage of species common to both seasons.

Gerais. Some faunal studies in the Cerrado and other biomes have found species of Gomphidae to account for only 5% of the total odonate species richness sampled, while species belonging to Libellulidae generally dominated, which is a family known to have species with abundant and common populations (*e.g.,* Machado *et al.,* 1991; Ferreira-Peruquetti & Fonseca-Gessner, 2003).

Nonetheless, the present study still found species of Libellulidae that had not been observed in previous inventories in Minas Gerais. One of these species was *Oligoclada stenoptera,* which is known from Ecuador where the genus *Oligoclada* is well represented (Rehn, 2003). In Brazil, as far we know, this species has only been documented in the state of Rondônia in the North Region of Brazil (Borror, 1931). Additionally, the species *Brachymesia herbida,* although widely distributed throughout Brazil, had not previously been reported in Minas Gerais (Table 1).

Aquatic invertebrate communities can vary among seasons since aquatic environments are particularly susceptible to seasonal changes (Bischof *et al.,* 2013; Dijkstra *et al.,* 2014). Changes in hydrology can influence odonate community composition due to changes in habitat and food availability (Corbet, 1999). The present study found species richness to be higher during the rainy season, as was similarly reported by Vilela *et al.* (2016), with 68% of the species sampled being exclusive to the rainy season and only 6.5% exclusive to the dry season. Likewise, Ferreira-Peruquetti & Fonseca-Gessner (2003) reported 42% of species sampled to be exclusive to the rainy season and only 14% exclusive to the dry season. These studies suggest that many odonates appear only during the rainy season, which is likely due to the availability of prey and resources for adult and larvae development.

CONCLUSION

The present study contributes relevant information about the richness, composition and distribution of species of odonates in the Triângulo Mineiro Region of Minas Gerais in particular, and the Cerrado biome in general. In addition, several rare species were recorded, as well as new records for the state. These new records are of great importance because they significantly increase knowledge regarding the distributions of these species, which are now known to include an area with a high level of anthropization. Therefore, given the size of the Triângulo Mineiro Region and the existence of extensive areas of agriculture and livestock, as well as the scarcity of studies on the diversity of odonates therein. Additional studies of odonates are needed for the region (De Marco & Vianna, 2005) to facilitate the development of conservation plans for this diverse group of insects.

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