http://dx.doi.org/10.1590/1519-6984.06914

Coleoptera associated with macrophytes of the genus *Salvinia* in four oxbow lakes in two river basins in southeast Brazil

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Received: April 25, 2014 – Accepted: September 7, 2014 – Distributed: November 30, 2015
(With 4 figures)

Abstract

Macrophytes in oxbow lakes represent an important substrate for the Coleoptera. Two oxbow lakes the Rio Paranapanema were studied and the other two Rio Mogi-Guaçu, in the State de São Paulo, Brasil. In this study, there is greater similarity between the communities of Coleoptera of lakes greater connectivity with the main river channel or the difference in the species of Salvinia collected in the lakes studied interferes Coleoptera fauna that uses as substrate. A total of 9,222 specimens of Coleoptera were collected and identified in 10 families and 40 genera. The analysis MDS for abundance of Coleoptera showed the grouping of the oxbow lakes the Paranapanema River and a distancing the oxbow lakes the Mogi-Guaçu. The PERMANOVA test did not reveal any difference in the fauna between the wet and dry periods. It was concluded that the connectivity between river and lake is not decisive for the richness and abundance of aquatic fauna of Coleoptera. Therefore, the richness and abundance of aquatic Coleoptera associated vary with the species of Salvinia used as substrate.

Keywords: aquatic macrophytes, oxbow lakes, aquatic insects, phytofauna.

Coleoptera associados à *Salvinia* em quatro lagoas marginais pertencentes a duas bacias hidrográficas no estado de São Paulo, Brasil

Resumo

As macrófitas em lagoas marginais constituem um importante substrato para os Coleoptera. Foram estudadas duas lagoas marginais ao Rio Paranapanema e outras duas ao Rio Mogi-Guaçu, no estado de São Paulo, Brasil. Neste estudo, haverá maior similaridade entre as comunidades de Coleoptera das lagoas de maior conectividade com o canal princial do rio ou a diferença na espécie de *Salvinia* coletada nas lagoas estudadas interfere na fauna de Coleoptera que a utiliza como substrato. Foram coligidos 9.222 espécimes de Coleoptera sendo identificadas 10 famílias e 40 gêneros. A análise MDS para abundância de Coleoptera mostrou o agrupamento das lagoas marginais ao Rio Paranapanema e um distanciamento das lagoas marginais ao Rio Mogi-Guaçu. Os resultados da análise PERMANOVA não mostraram diferença na composição faunística entre os períodos de chuva e seca. Concluiu-se que a conectividade entre rio e lagoa não é determinante para a riqueza e abundância da fauna de Coleoptera aquáticos. Portanto, a riqueza e a abundância de Coleoptera aquáticos associados variam com as espécies de *Salvinia* utilizadas como substrato.

Palavras-chave: macrófitas aquáticas, lagoas marginais, insetos aquáticos, fitofauna.

1. Introduction

Floodplains are formed by stretches of river flowing across gently sloping land, where the adjacent areas are flat. The temporary or permanent nature of these flooded areas is determined by the geomorphology of the area and the pattern of fluctuation of the water level (Henry, 2003).

Oxbow lakes, water bodies typical of floodplains, differ in morphometry and physiognomy, depending on how far they are from the main river of the system (Santos and Mozeto, 1992). In general, the littoral region of these lakes is colonized by a mix of water macrophyte (Glowacka et al., 1976). One of the distinguishing features of the oxbows in the floodplains of the Paranapanema and Mogi-Guaçu Rivers is the abundance of these plants, especially the extended stands of macrophytes of the genus *Salvinia*. These may be used as a food source (Thomaz and Cunha, 2010), site for oviposition of insects (Merritt and

Cummins, 1996), refuge from predators (Scheffer, 1998) and which represent an important substrate for benthic macroinvertebrates (Glowacka et al., 1976).

Among the insects found in freshwater systems, the Coleoptera form a group of great diversity and abundance (Fairchild et al., 2000), with about 10,000 species that are aquatic at one or more stages of development (Jäch and Balke, 2008). Some genera of the suborders Adephaga and Polyphaga are common inhabitants of lentic habitats, especially associated with plants in lakes, or in the sediment of shallow temporary ponds (Benetti and Cueto, 2004; Jäch and Balke, 2008).

Although the number of studies on aquatic Coleoptera in Brazil has been growing in the last few years, mainly in the work of Dr Nelson Ferreira-Junior (Ferreira-Junior et al., 1998, 2006; Ferreira-Junior and Braga, 2009), in the state of Rio de Janeiro, and Dr César João Benetti (Benetti et al., 2003, 2006; Benetti and Cueto, 2004), in the state of Rio Grande do Sul, they are still rare. Thus, this study is a pioneering investigation of the diversity and abundance of coleopterans associated with stands of *Salvinia* in four oxbow lakes in São Paulo State, two being in the drainage basin of the Paranapanema River and two in that of Mogi-Guaçu River.

2. Material and Methods

2.1. Study area

The climatic conditions in the river basins under study are classified as Köppen Aw (Setzer, 1966), with two periods: a hotter rainy season from November to April and a drier, more temperate season from May to October (Cavalheiro et al., 1990).

Lake Diogo and Lake Óleo (Figure 1), oxbow lakes left after meanders of the Mogi-Guaçu River, are located within the Jataí Ecological Station, a Conservation Unit in the district of Luis Antônio (São Paulo State, Brazil), between latitudes 21°33’ and 21°37’S and longitudes 47°45’ and 47°51’W.

Lake Cavalos and Lake Coqueiral (Figure 2), oxbow lakes in the Paranapanema River basin, are located near the point where the river flows into the Jurumirim Reservoir, in the district of Angatuba (São Paulo State, Brazil), between latitudes 23°08’ and 23°35’S and longitudes 48°30’ and 49°13’W.

2.2. Fauna collection and analysis

Three sampling sites were chosen in the littoral region of each lake, in places where stands of *Salvinia* were present, were collected at monthly intervals for one year, between March 2006 and February 2007 in the Paranapanema River lakes and between March 2010 and February 2011 in the Mogi-Guaçu Lakes. In the Lake Diogo, Coqueiral and Cavalos was collected Salvinia auriculata, in the Lake Óleo was collected Salvinia molesta. The plants were sampled with a small circular shrimp net of area 0.07 m^2 and mesh 0.25 mm and transported in the lake water in plastic pots to the laboratory. There, the fauna was extracted from the plant material by the method described by Afonso (2002). Coleopterans were preserved with 70% ethanol in bottles and identified under a stereo microscope, with the aid of taxonomic keys (Archangelsky et al., 2009;

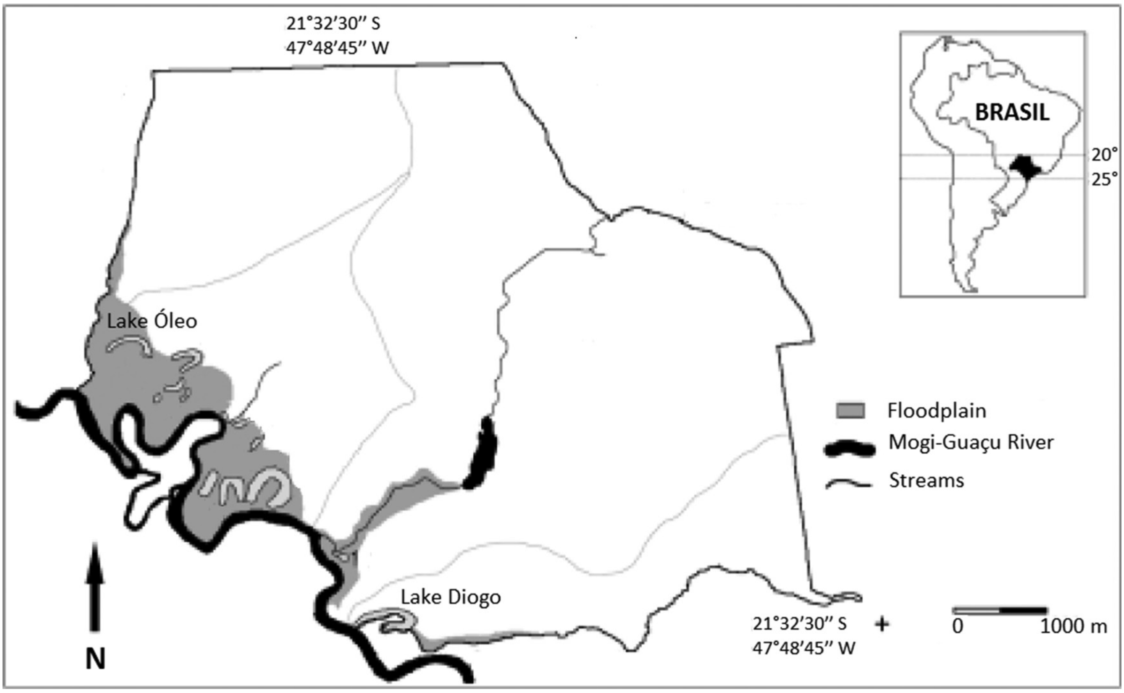

Figure 1. Location of Jataí Ecological Station with oxbow lakes in the floodplain, Lake Diogo and Lake Óleo (Adapted from: Marçal-Simabuku and Peret, 2002).

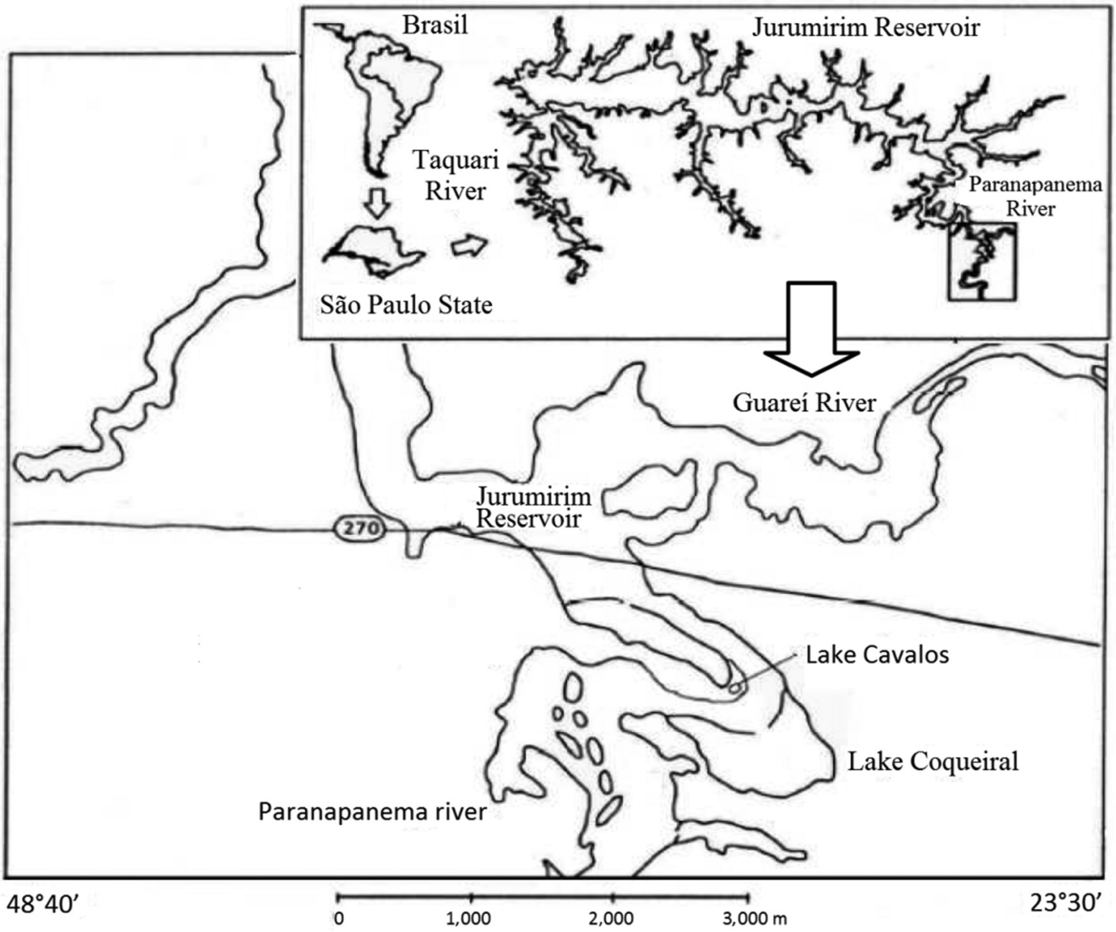

Figure 2. Paranapanema River in the region of its mouth in Jurumirim Reservoir, with oxbow lakes, Lake Coqueiral and Lake Cavalos (Adapted from: Davanso & Henry, 2006).

Benetti et al., 2003; Epler, 1996), specialized literature and expert assistance where necessary.

In order to analyze the composition of the aquatic coleopterans, the following metrics were calculated: taxon richness observed (sum of collected taxons) (S), total abundance (N), Shannon's diversity index (H'), Pielou's evenness index (E) and Simpson's dominance index (D).

To verify the similarity of the fauna in the four lakes studied, multidimensional scaling (MDS) analysis was performed with the program Past 2.09 (Hammer et al., 2001), on the basis of Bray-Curtis dissimilarity. The abundance data were subjected to the log(x+1) transformation, so as to diminish the influence of taxa present in very large numbers. Subsequently, a SIMPER analysis was used to identify those taxa that contributed the most to the dissimilarities between the lakes.

Differences in fauna composition between the lakes and between rainy and dry periods were identified by means of a PERMANOVA (Anderson, 2001), utilizing 1,000 permutations, with Bray-Curtis as a measure of dissimilarity and $p < 0.05$ as the criterion of significance. To obtain a graphic representation of the dissimilarity between the two climatic periods, an MDS analysis was carried out, employing the Bray-Curtis coefficient.

3. Results

From the analysis of the 9,222 collected specimens of coleopterans (beetle larvae and adults), 55 taxonomic units were identified as occurring in at least one of the lakes. These pertained to 10 families and 40 genera. Of these, 8 genera and 2 families were common to all 4 lakes. The family Hydrophilidae ("water scavenger beetles") predominated, representing almost 49% of all collected specimens, and the genus *Helochares* was numerically outstanding within this family, at both the larval and adult stages. The families Scirtidae and Noteridae ("burrowing water beetles") also made significant contributions to the community, with 24.3% and 15% of the specimens, respectively.

The numerical totals of specimens, families and genera were extremely similar in the 2 river basins: 51.4% of the specimens were collected from Lakes Diogo and Óleo, of the Mogi-Guaçu River basin, and these specimens were spread over 9 families and 26 genera (Tables 1 and 2), while the remaining 48.6% were from Lakes Coqueiral and

Table 1. Abundance of Coleoptera coletados in Lake Diogo for each month from March 2010 to February 2011.

	Lake Diogo											
	Mar	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
Curculionidae												
Cyrtobagous singularis Hustache, 1929 A	26	16	23	12	12	26	17	14	8	8	6	13
Neochetina eichorniae Warner, 1970 A												
Neobagous coarcticollis Hustache, 1926 A											1	
Curculionidae L	46	26	40	54	25	1				1		1
Dytiscidae												
Derovatellus A										1		
Laccophilus A	1	1	3	3	3		1	1		1	1	1
Pachydrus A										1		
Hydrovatus L		1										
Laccophilus L	3						2	2	5	2	4	1
Morfotipo 1 L	1									1		
Elmidae												
Macrelmis L										1		
Hydrochidae												
Hydrochus A						1	1					
Hydrophilidae												
Anacaena A								1				
Derallus A	5	4	7	4	9	3	4	1				
Helochares A	35	37	45	28	26	39	16	10	4	10	7	5
Phaenonotum A		1	4	5	8	8	7					
Tropisternus A	12	7	9	7	10	3	2	4		1		
Derallus L	31	33	10	7	10	20	8	2		7	3	3
Enochrus L					1		1	1		1		3
Helochares L	63	80	85	35	104	84	82	32	43	36	37	55
Phaenonotum L	1	1	1	1				2	1	1	1	
Tropisternus L	33	9	16	1	3	13	2	1		6		9
Lampyridae L									1			
Noteridae												
Hydrocanthus A		1	2	3	4	4	1	1				
Suphis A								1				
Suphisellus A				1								
Hydrocanthus L	2								1			
Scirtidae L	22	17	22	21	16	5	6	29	4	52	37	51
Staphylinidae												
Paederus punctiger Sharp, 1876 (affinis) A								2				

L = larva; A = adult; Mar = march; Apr = april; May = may; Jun = june; Jul = july; Aug = august; Sep = september; Oct = october; Nov = november; Dec = december; Jan = january; Feb = february.

Cavalos of the Paranapanema River basin and distributed in 9 families and 27 genera (Tables 3 and 4). The results for taxon richness, diversity indices, dominance and evenness indicated insignificant variation among the lakes. Lake Coqueiral, which is in the Paranapanema River basin and permanently connected to the river, had a greater abundance of coleopterans than Lake Cavalos, which is in the same floodplain but disconnected from the river. Conversely, in the Mogi-Guaçu basin, the results showed a lower abundance of coleopterans in Lake Diogo, connected to the river, than in the disconnected Lake Óleo (Table 5).

The MDS analysis was used to generate Figure 3, where it can be seen that the lakes in the Paranapanema River basin form a cluster, while those related to the Mogi-Guaçu River are far apart, confirming the low similarity between the fauna in Lakes Diogo and Óleo. Axes 1 and 2, used to build this chart, were found to explain 76% of the data variance. According to the SIMPER analysis, the taxa that

Table 2. Abundance of Coleoptera coletados in Lake Óleo for each month from March 2010 to February 2011.

	Lake Óleo											
	Mar	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
Curculionidae												
Cyrtobagous singularis Hustache, 1929 A	2	2		1		1	1		5	3	6	
Neochetina eichorniae Warner, 1970 A	1				1							
Sibina sp. A									1			
Curculionidae L			1								1	
Dytiscidae												
Bidessonotus A							1					
Laccophilus A			1	3								
Liodessus A							1					
Amarodytes L		1										
Hydrovatus L											1	
Laccophilus L	2	1									1	6
Vatellus L		1										
Elmidae												
Hexacylloepus L						1						
Hydrochidae												
Hydrochus A					6	4		4		1		
Hydrophilidae												
Derallus A	21	18	29	31	41	57	81	18	22	27	72	1
Helochares A		2			10	6		1	2	7	2	3
Phaenonotum A					1	2	1	1				
Tropisternus A		1	1	3	13	5	2	1	2	3		2
Derallus L	93	26	53	46	45	91	91	124	135	58	73	36
Enochrus L								1				1
Helochares L	3	1	1			2	8	8	10	30	30	53
Tropisternus L	4	1				1	16	14	5	18	14	12
Lampyridae L				2	1	2		1	5	3	4	
Noteridae												
Hydrocanthus A	14	3	2	22	49	32	22	7	16	7		10
Suphis A		1						1	2	5		1
Hydrocanthus L	10					2	11	49	39	6	6	1
Pronoterus/Mesonoterus L									1	2		
Suphis L		1						1	8	28	2	4
Scirtidae L		2	27	4	22	17	11	52		78	34	362

L = larva; A = adult; Mar = march; Apr = april; May = may; Jun = june; Jul = july; Aug = august; Sep = september; Oct = october; Nov = november; Dec = december; Jan = january; Feb = february.

contributed most to this dissimilarity were *Helochares* (larva), *Derallus* (adult and larva) and *Cyrtobagous similaris* Hustache, 1929 (adult) (Table 6).

The results of the PERMANOVA analysis showed no difference between the fauna composition in the rainy and dry periods (p = 0.1989). This similarity of the fauna between seasons was quite evident and can be seen clearly in Figure 4, which represents the MDS analysis of these data. Axes 1 and 2, used for this chart, explained 68% of the variance.

4. Discussion

The data collected here on the richness and abundance of Coleoptera associated with *Salvinia* with the literature reports on aquatic coleopterans, in which some authors pick out the family Hydrophilidae as the most abundant

Table 3. Abundance of Coleoptera coletados in Lake Coqueiral for each month from March 2006 to February 2007.

	Lake Coqueiral											
	Mar	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
Crysomelidae A								1				
Curculionidae												
Ochetina bruchi Hustache, 1926 A						2				2	2	
Neochetina eichorniae Warner, 1970 A						2				1	2	
Curculionidae L	1											
Dytiscidae												
Bidessonotus A					1		1					
Laccodytes A						1						
Laccophilus A						3						
Liodessus A				1	1		1					
Thermonectus A									1			
Celina L									1			
Laccophilus L											1	1
Morfotipo 1 L												1
Hydrochidae												
Hydrochus A						23	187	82	3	39	12	
Hydrophilidae												
Helochares A			7	15	9	9	6	6	9	7	30	3
Phaenonotum A		1	1	1		1	4		24	4	5	
Tropisternus A			7	15	9	12	4	25	3	14	7	
Enochrus L			1		1			1				3
Helochares L	6	16	19	32	43	48	8	14	12	6	44	68
Tropisternus L		2	2	18	1	15		4	13	20	64	58
Lampyridae L		4			1	5						1
Noteridae												
Hydrocanthus A		7	4	3	10	110	25	78	27	158	7	
Mesonoterus A									1			
Suphis A						9	2	2	7	1	3	
Suphisellus A			1				1	1	1	2		1
Hydrocanthus L			1			1	1		1		3	9
Pronoterus/Mesonoterus L								1	1			3
Suphis L	1	1										2
Scirtidae L	15	109	109	108	115	131	47	65	16	50	50	104
Staphylinidae												
Stenus A							1					

L = larva; A = adult; Mar = march; Apr = april; May = may; Jun = june; Jul = july; Aug = august; Sep = september; Oct = october; Nov = november; Dec = december; Jan = january; Feb = february.

in ponds and lakes, followed by Dytiscidae and Scirtidae (Nascimento et al., 2011; Benetti and Hamada, 2003). Boneto et al. (2011) observed that the greatest number of hydrophilids was found in stands of *Eichhornia azurea* (blue water hyacinth) in Lake Cascalho in the Upper Paraná River basin (MS, Brazil), while Moretti et al. (2003) recorded the largest number of dytiscids on *Pontederia lanceolata* in Coqueiro Bay, Poconé Swamp (MT, Brazil).

Silva and Henry (2013), in a comparative study of the macroinvertebrate phytofauna associated with *Eichhornia azurea* in 6 oxbow lakes on the Parapanema River, identified Dytiscidae, Noteridae and Hydrophilidae, at both the larval and adult stage, noterid larvae being the most abundant. Many species in the families Dytiscidae and Noteridae are known to associate with aquatic plants possessing aerenchyma, using them for oviposition and pupation, while those in other families, such as Hydrophilidae and Scirtidae, use aquatic macrophytes possibly as a source of food, given that most of these species are herbivorous (Benetti and Cueto, 2004).

The family Scirtidae was collected only at the larval stage, since the adults are terrestrial and inhabit the riparian zone, flying or walking over stones or in the vegetation (Brown, 1987). Specimens of other families collected, such

Table 4. Abundance of Coleoptera coletados in Lake Cavalos for each month from March 2006 to February 2007.

	Lake Cavalos											
	Mar	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
Crysomelidae A											1	
Curculionidae												
Ochetina bruchi Hustache, 1926 A						1	1					
Neochetina eichorniae Warner, 1970 A				1		6	2				1	
Curculionidae L						1						
Dytiscidae												
Anisomeria A							1					
Desmopachria A		1										
Hydaticus A							1					
Laccophilus A					1	15	26			3		
Liodessus A							1					
Neobidessus A							1					
Megadytes A				1								
Thermonectus A				1								
Tribo Bidessini A				3								
Hydrovatus L										1		
Laccophilus L	1											
Hydrochidae												
Hydrochus A *variação*									1			
Hydrochus A				4	14	7	14		2	9		
Hydrophilidae												
Helochares A	3	7	13	25	11	23	10	24	2	7	11	4
Phaenonotum A		5		1	1	6	12	6	2	2	1	1
Tropisternus A	1	3	6	20	9	16	17	52	22	34	1	3
Berosus L										2		
Enochrus L		1								2		
Helochares L	28	23	5	17	19	31	15	80	14	19	48	19
Paracymus L								1		1		
Tropisternus L	7	12	9	14				13	29	23	25	11
Noteridae												
Hydrocanthus A	2	13	8	10	26	41	76	101	105	106	9	8
Notomicrus A						1	1					
Mesonoterus A						1				1		
Pronoterus A						1						
Suphis A		1							1	2		
Suphisellus A	1			6		3	10				1	
Hydrocanthus L	3	4									5	4
Pronoterus/Mesonoterus L	2											
Scirtidae L	14	65	13	46	98	81	35	28	5	18	5	25

L = larva; A = adult; Mar = march; Apr = april; May = may; Jun = june; Jul = july; Aug = august; Sep = september; Oct = october; Nov = november; Dec = december; Jan = january; Feb = february.

as Curculionidae, Chrysomelidodae and Staphylinidae, are not strictly aquatic (Jäch and Balke, 2008; Majka, 2008), but are associated with riparian vegetation and can live on the emergent parts of aquatic plants, especially when they are related to the plants of the terrestrial habitat on the neighboring bank, as is the case at the study sites. The majority of the species in the family Lampyridae are land-based, with very few aquatic representatives at the larval stage (Jäch and Balke, 2008).

According to Santos and Thomaz (2004) and Takeda et al. (2004), flood pulse events and the degree of connectivity between floodplain lakes and the river are factors that strongly influence the structure of the aquatic plants in those lakes and, consequently, the associated

Table 5. Observed metrics for each lake under study (M: mean. SD: standard deviation).

	M Diogo	SD Diogo	M Óleo	SD Óleo	M Coqueiral	SD Coqueiral	M Cavalos	SD Cavalos
S	12.75	2.56	12.08	2.64	10.91	3.28	10.91	3.23
N	174.33	70	220.5	111.74	212.25	95.49	161.41	78.48
D	0.24	0.08	0.29	0.1	0.35	0.15	0.24	0.06
H’	1.79	0.27	1.59	0.29	1.43	0.41	1.73	0.21
E	0.7	0.06	0.64	0.1	0.6	0.11	0.74	0.09

S = taxon richness observed; N = total abundance; S = Simpson’s dominance; H’ = Shannon’s diversity; E = Pielou’s evenness.

Table 6. Taxa that contributed the most to the dissimilarity between Lakes Diogo and Óleo according to the SIMPER analysis.

Taxa	Cumul. Cont. %	Mean abund. 1	Mean abund. 2
Helochares L	11.25	1.75	0.68
Derallus A	22.15	0.39	1.39
Derallus L	32.22	0.84	1.81
Cyrtobagous singularis Hustache. 1929 A	41.25	1.14	0.21
Helochares A	49.88	1.21	0.33
Hydrocanthus A	58.28	0.16	0.97
Scirtidae L	65.08	1.25	1.14
Tropisternus L	70.78	0.6	0.59

Cumul. Cont. = cumulative contribution; Abund. = abundance; L = larva; A = adult.

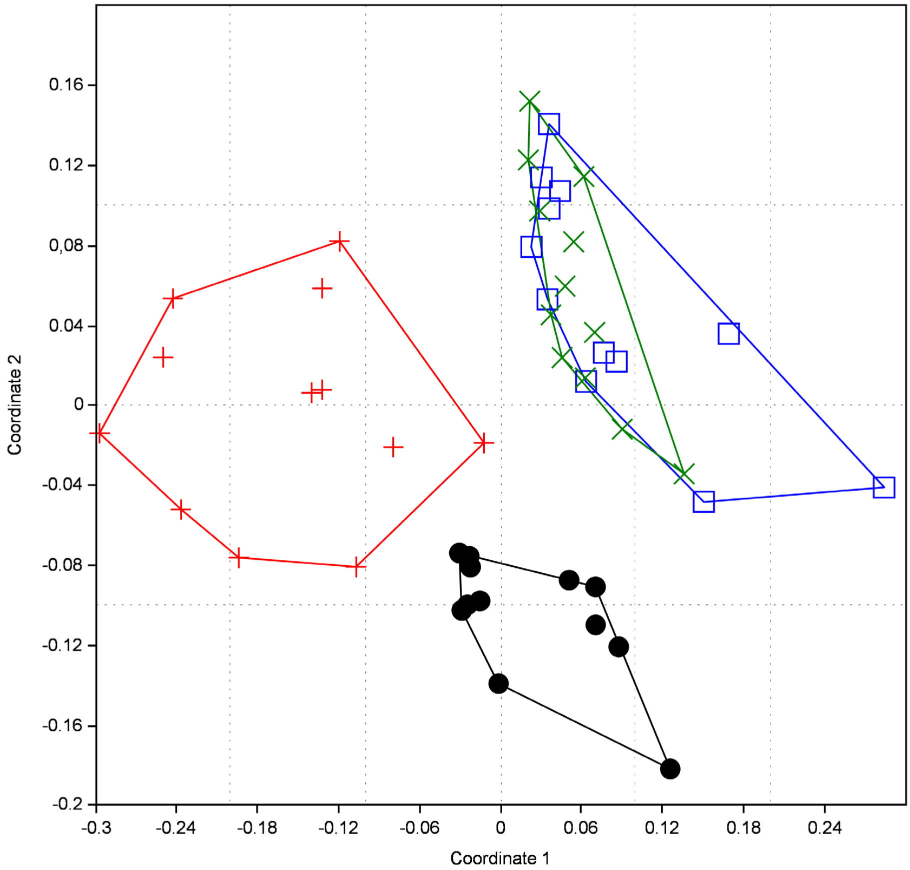

Figure 3. Chart showing MDS analysis based on Bray-Curtis dissimilarity of Coleoptera abundance data for the organisms in each collection made in the 4 lakes: + Lake Óleo, ●: Lake Diogo, □: Lake Coqueiral and x: Lake Cavalos.

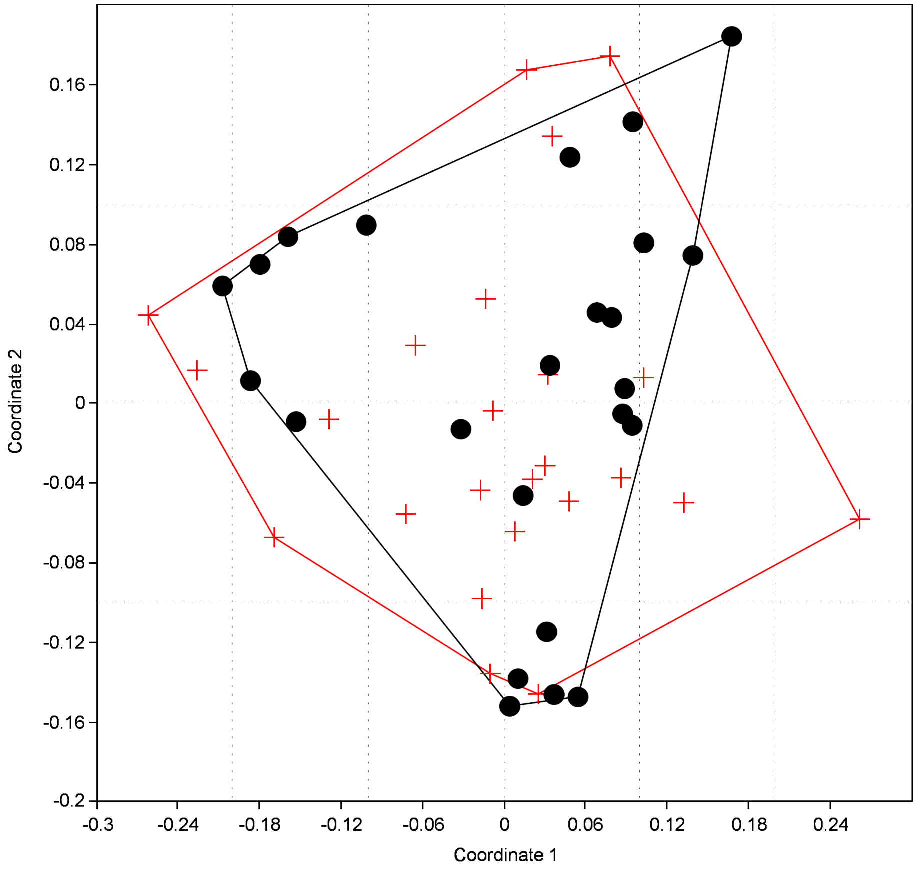

Figure 4. Chart showing MDS analysis based on Bray-Curtis dissimilarity of Coleoptera abundance data for the organisms in collections made in the rainy and dry seasons: + rainy, ●: dry.

fauna. Albertoni et al. (2005, 2007) noted that *Salvinia* is a common macrophyte in subtropical aquatic systems that forms dense stands all year round. Such perennial plants, when they also cover a broad area (owing to an extended root system), exhibit high richness, abundance and diversity of Coleoptera (Scheffer, 1998; Thomaz and Cunha, 2010).

In the lakes under study, *Salvinia* formed a dense vegetation cover, which favored the high taxon richness observed among the Coleoptera, also observed by Valladares et al. (2002) in shallow lakes located at one end of the Castille Canal, north of the Meseta Ibérica. Fontanarrosa et al. (2013) also reported a dominance of those coleopterans associated with macrophytes, in two lakes in the province of Buenos Aires, Argentina.

Studies of other groups of invertebrates associated with *Salvinia* have shown similar patterns. In Lake Coqueiral, Davanso (2010) observed very high densities of chironomid larvae and oligochaetes and, to explain these data, emphasized the importance of the permanent connection between this lake and the river. Low connectivity hinders the exchange of matter, energy and organisms and thus reduces biodiversity (Ward et al., 1999). Conversely, as connectivity rises between a floodplain lake and the river, organisms acquire a new way to migrate between the two habitats and the joint channel begins to function as a "dispersion corridor" for populations of aquatic organisms (Gubiani, 2009). This may have been a reason for the similarity between the lakes in the same drainage basin.

According to the PERMANOVA and MDS analyses, there was no significant difference in fauna between the rainy and dry periods, suggesting that the seasonal fluctuation in water level does not interfere with the composition of the aquatic coleopteran fauna. This is in contradiction with a report by Silva and Henry (2013) that the richness and abundance of macroinvertebrates associated with *Eichhornia azurea* were greater in the period when the river-lake connectivity was higher; they explained this in terms of the probable influence of the flood pulse, which would favor greater heterogeneity of habitats for the community.

Fulan et al. (2011) recorded that Lake Cavalos, despite being small and isolated, has a considerable density of fish, which can prey on Odonata larvae. This predation could equally apply to coleopterans; indeed, in this lake, a smaller number of specimens were collected than in the other lakes in this study. Ferreira (1998) and Meschiatti (1995) noted the presence of insect larvae in the stomach contents of herbivore/insectivore species of fish, in Lakes Óleo and Diogo, respectively. The invertebrates associated with aquatic macrophytes are important natural food sources for fish and other higher-level consumers (Ohtaka et al., 2011). The beetle larva is the stage most vulnerable to predation, as it has not yet developed the very hard exoskeleton possessed by the adult (Bosi, 2001).

The MDS analysis of the four lakes showed that there is little similarity between the coleopteran communities of Lakes Diogo and Óleo. This is probably due to the different species of *Salvinia* found in the macrophyte stands in the two lakes. In Lake Diogo, these stands consist mainly of *S. auriculata* Aublet, which has longer and denser roots than the species observed in Lake Óleo, *S. molesta* Mitchell. The latter was reported by Nelson (2009) to have false roots, thinner and more delicate than those of *S. auriculata*. This difference could well explain the greater abundance of the genus *Derallus* (Hydrophilidae) in Lake Óleo, both at the larval and adult stages. Beetles in this genus are characteristically small (< 3.0mm), enabling them to inhabit the finer roots of *S. molesta* more successfully than larger organisms.

Based on the analyzes of this study it is concluded that there is greater similarity between the communities of Coleoptera the lakes that are inserted in the same region and that, in this study, the connectivity between river and lake is not decisive for the richness and abundance of aquatic fauna of Coleoptera. And the richness and abundance of aquatic Coleoptera associated range with the species of *Salvinia*.

Acknowledgements

We are grateful to CNPq for the scholarship; to Dr Rosemary Davanso; Dr João Fulan and Prof. Dr Raoul Henry for donating material from the oxbow lakes in the Paranapanema River basin; to Dr Sérgio Vanin and Angélico Vasenjo for their help in the identification of Curculionidae and Staphylinidae and to all those who made it possible to carry out this study.

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