



ECOLOGY

Spider species composition in the tree-shrub strata of riparian forests and its microhabitats in southern Brazil

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ABSTRACT. The composition of the spider fauna of riparian forests is insufficiently known. These forests, adjacent to both aquatic and terrestrial environments, are recognised as having important ecosystem functions. We compare the composition of spider assemblages of four riparian forests in different drainage basins, along with their microhabitats (edges and forest interior), in the state of Rio Grande do Sul, southern Brazil. Sampling was carried out in the riparian forests of the following rivers: Piratini, municipality of Arroio Grande; Camaquã, municipality of Cristal; Sinos, municipality of Parobé, and Maquiné, municipality of Maquiné. Two samples per season were collected in two years, by sampling the tree-shrub strata with a beating tray, following fixed transects. There were six transects per drainage basin, two per microhabitat: grassland edge, forest interior and river edge. Overall, 42,057 spiders were sampled (juveniles: 79%; adults: 21%). Among the adults (8,851 individuals), we identified 440 species. Similarity analyses (ANOSIM) indicated that the araneofauna composition of the four drainage basins differ in their quantitative (Morisita) and qualitative (Simpson) similarity indexes. There were no differences in composition among microhabitats. The composition of the Maquiné River basin was the most distinct, possibly due to a greater influence of the Atlantic forest on it and a greater dominance of the Linyphiidae *Sphexcozone personata* (Simon, 1894) (SIMPER analysis, contribution to dissimilarity: 12.15%). Differences in spider composition on large spatial scales most likely reflect regional variations in a number of environmental factors, and result in each area having in increased importance in terms of conservation.

KEY WORDS. Spider assemblage, beating tray, ordination, microhabitats, riparian forest.

The fact that spiders are widely distributed in terrestrial ecosystems makes them efficient organisms to help elucidate biodiversity patterns (UETZ 1991, FOELIX 1996, PLATNICK 1999, CARDOSO 2009). In order to know and to catalogue the biodiversity elements of a given place, however, it is necessary to conduct biodiversity surveys (DENNIS & RUGGIERO 1996). Such inventories should not be restricted to a list of species, but need to include information on systematics, ecology, and biogeography (HALFFTER et al. 2001).

Among the environments where spiders have already been inventoried, riparian forests are still largely unknown (RODRIGUES et al. 2014). These habitats have important ecosystem functions, since they are ecotones between adjacent environments and therefore harbor a diverse fauna (NAIMAN et al. 1993). Riparian

forests are peculiar: they occupy a small proportion of the hydrographic basin they belong to, are considered ecologically stable and are well defined, have high plant biomass production and support high biodiversity levels compared to other forest environments (DAVIDE & BOTELHO 1999). They are considered extremely important for plant dispersal, and as “corridors” for animal movement (NAIMAN et al. 1993, MALAVASI et al. 2004), including spiders (RAIZER et al. 2005, RODRIGUES et al. 2014). However, these corridors may be interrupted when plant formations are altered. In the past, Brazilian native riparian forests were partly substituted for large plantations of exotic trees and, very close to rivers, by agricultural endeavors, a process that has resulted in numerous forest remnants and semi-natural areas (DENNIS 1997, MALAVASI et al. 2004).

Understanding the composition of spider species and their distribution within riparian forests is the first step to increasing our knowledge on the dynamics of spider assemblages. This information may be helpful in planning environmental monitoring, and ultimately improving the conservation of these forest formations. Data on the spider fauna of the native areas of southern Brazil have increased through simple species lists and ecological studies (INDRUSIAK & KOTZIAN 1998, BONALDO & OTT 2002, RODRIGUES 2005, SILVA & ARAÚJO 2005, OTT et al. 2006, BONALDO et al. 2007, PODGAJSKI et al. 2007, BALDISSERA et al. 2008, RODRIGUES & MENDONÇA, 2012, RODRIGUES et al. 2014). However, there are still few studies comparing species composition among different ecosystems.

There are a number of factors determining the species composition of spider assemblages (UETZ 1991, FOELIX 1996). For example, human impacts, which lead to edge effects in forests (MURCIA 1995), and changes in abiotic factors (BALDISSERA et al. 2008) may force spiders to live in a more open environment where sun light, temperature, humidity and other factors are different than the conditions they are adapted to (RODRIGUES et al. 2014). Spiders are known to be strongly influenced by habitat structure (UETZ 1991, GALLÉR & SCHWÉGER 2014), including vegetation structure (WU & CHENG 2012, RODRIGUES et al. 2014) and microclimatic factors (SAMU et al. 1999). In this work we compare the spider assemblages of three distinct microhabitats (edges: river edge and grassland edge; and forest interior) and four distinct drainage basins of a riparian forest of the state of Rio Grande do Sul, southern Brazil. We also give a list of the spider species found in these riparian forests.

MATERIAL AND METHODS

Sampling took place in four riparian forests on four distinct drainage basins in southern Brazil, state of Rio Grande do Sul (RS) (Fig. 1). Detailed information on these basins can be found in RODRIGUES & MENDONÇA (2012). Their main characteristics are: 1) Piratini River (PR), sampling site at the municipality of Arroio Grande (31°54'06.47"S, 52°39'08.29"W), 14 m a.s.l., good state of conservation, largest continuous native forest segment in the coastal plain region, climate TE UM "humid temperate" (MALUF 2000); 2) Camaquã River (CR), sampling site at the municipality of Cristal (31°01'01.7"S, 51°56'42.0"W), 14 m a.s.l., good state of conservation, continuous forest at the centre-south part of the Coastal Plain region, climate STE UM "humid subtemperate" (MALUF 2000); Sinos River (SR), sampling site at the municipality of Parobé (29°41'06.94"S, 50°51'05.98"W), 6-10 m a.s.l., fragmented forest in the Serra Geral slopes region, sampling site at the largest fragment available, climate ST SB "sub-humid subtropical" (MALUF 2000); Maquiné River (MR), sampling site at the municipality of Maquiné (29°40'47.99"S, 50°11'20.03"W), between the Serra Geral slopes and the Coastal Plain, belongs to Atlantic forest Biosphere Reserve recognized by UNESCO, climate is ST PU "perhumid subtropical" (MALUF 2000).

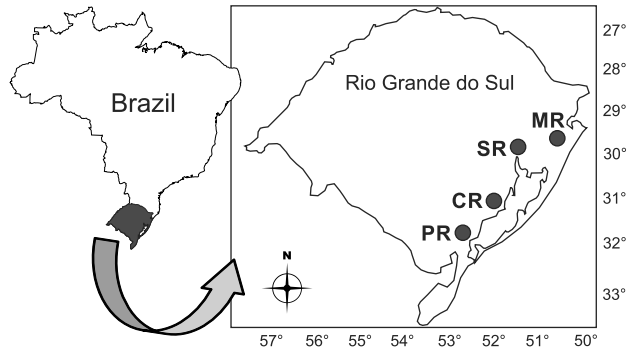


Figure 1. Schematic map of Brazil and detail of state of Rio Grande do Sul with riparian forests sampled. (PR) Piratini river, (CR) Camaquã river, (SR) Sinos river, (MR) Maquiné river.

Fieldwork lasted two years (August 1st, 2007 to June 6th, 2009), with two samplings per season (four seasons: spring, summer, autumn and winter) at each of the four drainage basins, totaling 64 samples overall, thus covering distinct times of the year, differences in vegetation (e.g., plant phenology) and climatic variability (temperature, rainfall, river levels). To evaluate spider fauna diversity we used six transects (approximately 30 m each) per sampling site, straight 4 m-wide lines, parallel to the river. These were placed in different microhabitats at each forest site: two transects at the forest edge with the river (river edge, RE); two transects at the forest interior (FI) and the latter two at the forest edge with neighboring grasslands (grassland edge, GE). Transects at the same microhabitat were placed at least 500 m far from each other. Overall, 24 transects were thus established on all forest sites.

The method employed for spider capture was the beating tray (BT), which allows access to tall herbs, small and medium-sized shrubs, small trees and large tree branches, along with woody vines (CODDINGTON et al. 1996, INDRUSIAK & KOTZIAN 1998, SØRENSEN et al. 2002). On each transect, spiders were sampled for 45 min with a 70 cm x 70 cm BT with white nylon fabric, totaling 288 h of sampling. Collecting was carried out by the first and second authors.

Spiders were kept in vials and preserved in ethanol 80%. The material was identified by the first author in the Laboratório de Aracnologia and the material was deposited in the spider collection of the Museu de Ciências Naturais, in the Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, Brazil (MCN/FZB, curator: Ricardo Ott).

The species composition of the four distinct localities and the three microhabitats were compared with separate ANOSIM tests (CLARKE & WARWICK 1994). The null hypotheses are that there are no differences in species composition in space in a larger scale, among drainage basins, and that there are no differences in space in a smaller scale, among microhabitats. Two tests were employed per factor, each with a different similarity index, one qualitative (Simpson) and one quantitative (Morisita).

With the same composition matrix we plotted two ordinations (non-metric multidimensional scaling, NMDS), one for each of the previously mentioned indexes. For each ordination we also obtained stress values, measuring the relationship between real distances, obtained with dissimilarity indexes between samples, with distances used in the NMDS.

A SIMPER (Similarity percentage) analysis was employed to evaluate which species contributed more to the dissimilarity (Bray Curtis index) among basins and microhabitats (CLARKE & WARWICK 1994). All analyses were implemented in PAST (Paleontological Statistics, HAMMER & HARPER 2009).

RESULTS

Overall, 42,057 spiders were collected, representing 35 families. For the purpose of analysis, only adults were considered, since immature spiders are difficult to identify to species. However, immatures predominated in the inventory, representing 79% of all specimens captured. The total sample contained 8,851 adult spiders (21%), representing 29 families (Appendix 1), and females were more abundant (60.8%) than males (39.2%).

Family composition among basins and microhabitats

Only juvenile spiders represented the following families in our samples: Ctenidae, Hersiliidae, Idiopidae, Lycosidae, Pisauridae and Segestriidae. Among the families that were represented by adults, Theridiidae predominated ($n = 4,363$ individuals, 49.3% of the total), followed by Linyphiidae (1,646, 18.6%), Salticidae (742, 8.4%), Araneidae (533, 6.1%) and Thomisidae (265, 3%), which together comprised 85% of all spiders.

The riparian forest of the Maquiné River basin had the greatest number of families (25), followed by Camaquã and Sinos (21 families each), with the Piratini River scoring only 20 families. Five families were only found at the Maquiné River (Clubionidae, Hahniidae, Gnaphosidae, Scytodiidae and Synotaxidae) and one at the Piratini River (Dictynidae). Sixteen families were shared among distinct basins. Theridiidae was the most abundant family, with more than 50% of the sampled spiders in each basin, except for the Maquiné River basin, where Linyphiidae dominated.

The family composition of adults was very similar among microhabitats, with 25 families at each edge (river and grassland) and 24 families at the forest interior. Theridiidae was again the predominant family in all microhabitats, followed by Linyphiidae. The three microhabitats shared 22 families, with one exclusive family at each one (RE: Clubionidae, FI: Gnaphosidae, GE: Dictynidae, Appendix 1).

Species list and composition among basins and microhabitats

Overall there were 440 spider species/morphospecies, in 168 genera. A total of 232 named species were obtained, representing 53% of all adults. The other 47% of the specimens could not be identified. They were separated into morphospe-

cies, and we believe that at least some of them might represent undescribed species (Appendix 1). *Acragas nigromaculatus* (Mello-Leitão, 1922), *Cylistella cuprea* (Simon, 1864), *Faiditus alticeps* (Keyserling, 1891), *Lyssomanes leucomelas* Mello-Leitão, 1917, *Mopiopia labyrinthea* (Mello-Leitão, 1947), *Opas paranensis* (Mello-Leitão, 1937), *Runcinioides argenteus* Mello-Leitão, 1929, *Sanogasta maculosa* (Nicolet, 1849), *Stephanopsis colatinae* Soares & Soares, 1946, *Synema nigrianum* Mello-Leitão, 1929 and *Trogloneta cantareira* Brescovit & Lopardo, 2008 are recorded for the first time for the state of Rio Grande do Sul and *Conifaber yasi* Grismado, 2004, *Deinopis amica* Schiapelli & Gerschman, 1957 and *Senoculus purpureus* (Simon, 1880) are new records for Brazil. Among the most common families, Araneidae and Theridiidae had the highest percentages of named spider species (95.3% and 64.7%, respectively), which is an indication that the taxonomy of these two families in southern Brazil is well known.

Amaurobiidae, Clubionidae, Dictynidae, Gnaphosidae, Hahniidae, Mysmenidae, Nephiliidae, Scytodiidae and Synotaxidae were each represented by a single species, as follows: *Hahnia* sp. (Hahnidae), *Scytodes maquine* Rheims & Brescovit, 2009, and *Synotaxus longicaudatus* (Keyserling, 1891) (Synotaxidae), were only found at the Maquiné River basin; *Elaver brevisipes* (Keyserling, 1891) (Clubionidae), Dictynidae undetermined (Dictynidae), and *Zimromus montenegro* Buckup & Brescovit, 1993 (Gnaphosidae) were singletons. All other families had more than one individual and were registered at more than one basin (Appendix 1).

Of all species/morphospecies, 47 (10.68%) were shared among all basins, 64 (14.54%) were shared at least among three basins, 104 (23.64%) were shared between at least two basins, and most (225 species, 51.14%) were exclusive to a single basin. Riparian forests of the Piratini and Camaquã basins had the greatest number of shared species (34 species), the smallest being between Piratini and Maquiné (9). The greatest number of exclusive species was recorded at the Maquiné basin (82 species) and the fewest number of exclusives at Sinos basin (38); the forests at Piratini and Camaquã had nearly the same number of exclusive species (55 and 50, respectively).

The most abundant species was *Sphecozone personata* (Simon, 1894) ($n = 1,222$, 13.8% of the total), but it was almost exclusive to the Maquiné River basin, except for two individuals found at Sinos basin. The second most abundant species, *Thymoites promatensis* Lise & Silva, 2009 ($n = 436$, 4.93%) was recorded in all rivers except Maquiné, and the third most abundant, *Spintharus gracilis* Keyserling, 1886 ($n = 325$, 3.67%) was sampled from all basins except Piratini (Appendix 1).

Among the spider species for which more than 100 individuals were collected (22 species), or which represented more than 1% of the total, nine were not found at all rivers. Some of those were sampled from only one or two of the basins (Appendix 1).

Among all microhabitats, 127 species (28.86% of the total) were shared, 129 (29.32%) were shared between at least two, and 184 species (41.82%) were exclusive to one microhabitat (Appendix 1). The greatest number of shared species was found

between the edges (river edge and grassland edge: 63 species) and the greater number of exclusive species occurred at the edge of the grassland (75 species), followed by the river edge (56) and forest interior (53). Of the four most abundant species, equivalent to more than 25% of the total, all were predominant in the forest interior, each with almost 50% of all individuals recorded there. *Thymoites promatensis* was more dominant in the forest interior (>88%).

Araneofauna composition quantitative similarity and dissimilarity

The quantitative (Morisita, ANOSIM: $R = 0.824$, $p < 0.0001$) and qualitative indexes (Simpson, ANOSIM: $R = 0.809$, $p = 0.001$) in our results indicate that the spider fauna differ significantly among river basins. The SIMPER analysis reveals that *Sphecozone personata* contributed a much greater value (12.15) than the other species (Table 1) when it comes to quantitative differences among river basins. The first ten species, all contributing more than 1%, together contribute 38% of the total dissimilarity among rivers.

Table 1. SIMPER analysis for the ten spiders species contributing most to dissimilarity among riparian forests in southern Brazil. ¹Species percentage contribution to dissimilarity, ²cumulative dissimilarity among riparian forests, ³average species abundance in each riparian forest.

Species	Contribution ¹	Cumulative ² (%)	Average species abundance ³			
			Piratini	Camaquã	Sinos	Maquiné
<i>Sphecozone personata</i>	12.150	15.61	0.00	0.0	0.667	407.00
<i>Thymoites promatensis</i>	3.992	20.73	4.33	45.0	96.000	0.00
<i>Spintharus gracilis</i>	2.774	24.30	0.00	3.0	33.000	72.30
<i>Hetschkia gracilis</i>	2.135	27.04	10.30	45.3	1.000	43.30
<i>Theridion calcynatum</i>	1.854	29.42	44.00	22.0	0.000	0.00
<i>Wamba crispulus</i>	1.845	31.79	43.00	33.0	10.000	3.33
<i>Phycosoma alta</i>	1.452	33.65	21.70	18.3	26.300	0.00
<i>Phoroncidia reimoseri</i>	1.296	35.32	0.00	2.0	35.300	9.00
<i>Metagonia</i> sp.	1.161	36.81	0.00	18.7	0.000	28.00
<i>Mangora strenua</i>	1.148	38.28	29.00	10.0	3.330	2.33

Average dissimilarity overall: 77.86

Results of the multivariate analysis (NMDS) revealed a proximity between the Piratini and Camaquã rivers, both in the qualitative (stress: 0,166) (Fig. 2) and quantitative (stress: 0,126) (Fig. 3) indexes, but a larger distance was revealed for the Maquiné River. The Sinos River is at the threshold between the Piratini-Camaquã and Maquiné rivers. With respect to the qualitative index, it is possible that the Maquiné River is more distinct due to the elevated number of adult spiders of the family Linyphiidae, since Theridiidae adults predominated at all other basins. In the qualitative index, the Maquiné River basin formed an isolated cluster, most likely due to the high number of exclusive species. At the different microhabitats, species composition

was not significantly distinct, neither according to quantitative (Morisita, ANOSIM: $R = -0.078$, $p = 0.709$, Fig. 4), nor qualitative indicators (Simpson, $R = 0.008$, $p = 0.442$, Fig. 5). The NMDS ordination had stress values close to the ones reported above: 0.127 for Morisita (Fig. 4) and 0.165 for Simpson (Fig. 5).

In the SIMPER analysis for microhabitats (Table 2), species contributing the most were the same as for the basins analysis (*S. personata*, *T. promatensis*, *S. gracilis*), with greater values at the forest interior. The ten species in Table 2 contributed more than 36% to the dissimilarity among microhabitats. At basins as well as in microhabitats, among these first ten species with the highest contribution, seven belong to Theridiidae.

Table 2. SIMPER analysis for the ten spiders species contributing most to dissimilarity among microhabitats of riparian forests in southern Brazil. ¹Species percentage contribution to dissimilarity, ²cumulative dissimilarity among microhabitat, ³average species abundance in each microhabitat.

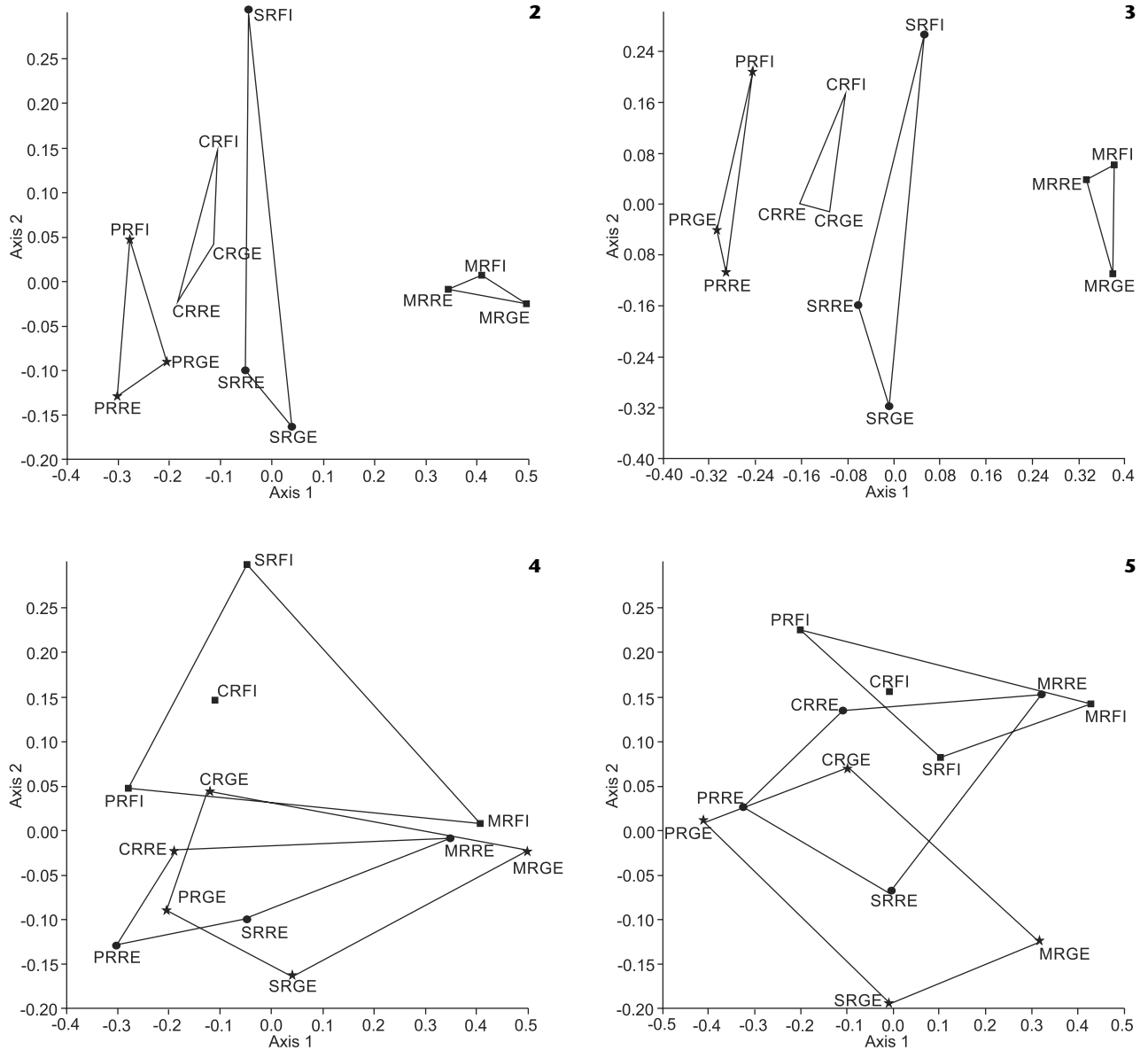
Species	Contribution ¹	Cumulative ² (%)	Average species abundance ³		
			Grassland edge	River edge	Forest interior
<i>Sphecozone personata</i>	9.677	13.03	82.50	73.30	150.0
<i>Thymoites promatensis</i>	4.528	19.13	8.25	4.25	96.5
<i>Spintharus gracilis</i>	2.319	22.25	16.00	29.50	35.8
<i>Hetschkia gracilis</i>	1.909	24.82	23.80	13.00	38.3
<i>Wamba crispulus</i>	1.635	27.03	26.30	20.80	20.0
<i>Theridion calcynatum</i>	1.498	29.04	17.00	15.30	17.3
<i>Phycosoma alta</i>	1.412	30.94	20.80	9.50	19.5
<i>Phoroncidia reimoseri</i>	1.352	32.77	1.25	7.00	26.5
<i>Mangora strenua</i>	1.231	34.42	2.50	5.75	25.3
<i>Miagrammopes</i> sp. 1	1.181	36.01	1.00	8.50	25.5

Average dissimilarity overall: 74.26

DISCUSSION

In the present study, immature spiders predominated. The percentage of juvenile spiders sampled in the tropics and subtropics is usually about 60-70% (SILVA 1996, SØRENSEN et al. 2002). The percentage we report here is close to that obtained by other authors using BT in southern (RODRIGUES 2005: 27.2% adults, BONALDO et al. 2007: 32.6%, BALDISSERA et al. 2008: 15%), south-eastern (GONÇALVES-SOUZA et al. 2007: 18%), west-central (RAIZER et al. 2005: 28%) and north-eastern Brazil (OLIVEIRA-ALVES et al. 2005: 29%).

The predominance for Theridiidae in our samples was expected, in view of the sampling method. Members of this family are usually among the most species rich and abundant spiders in the tree-shrub strata, in inventories in southern Brazil (RODRIGUES 2005, SILVA & ARAÚJO 2005, OTT et al. 2006, BALDISSERA et al. 2008) and in riparian forests and similar areas (BONALDO et al. 2007). However, in a study comparing samples collected with BT at Turvo State Park (north-western portion of the state



Figures 2-5. Non-metric multidimensional scaling (NMS) of spider fauna composition in southern Brazil. (2-3) Among riparian forests: (2) Morisita index (stress: 0.166); (3) Simpson index (stress: 0.126). (4-5) Among microhabitats: (4) Morisita index (stress: 0.127); (5) Simpson index (stress: 0.165). (PR) Piratini river, (CR) Camaquã river, (SR) Sinos river, (MR) Maquiné river, (GE) grassland edge, (RE) river edge, (FI) forest interior.

of Rio Grande do Sul (RS)), Salticidae predominated in an area of continuous forest, (PODGAISKI et al. (2007). All families recorded by previous studies in other ecosystems of RS, using the same sampling method we used, were also collected in riparian forests, with a few exceptions. Hersiliidae, recorded by INDRUSIAK & KOTZIAN (1998) from the central portion of the state, was represented only by immature spiders in our samples. BONALDO et al. (2007) sampled Caponiidae and Selenopidae in different ecosystems,

including a few riparian forests. PODGAISKI et al. (2007), using BT, obtained only immatures of Ctenidae, Lycosidae and Pisauridae in riparian forests. OTT et al. (2006) recorded Ctenidae, Lycosidae and Pisauridae only with other sampling methods, not BT, and observed that these families are nocturnal. In the west-central region of Brazil, state of Mato Grosso, RAIZER et al. (2005) studied the araneofauna of distinct environments, including various riparian forests of the Paraguay River, and recorded Araneidae

as dominant. The family and species composition in our results are very different from theirs. This is possibly due to the fact that RAIZER et al. (2005) used nocturnal searching as a sampling method, which favors the capture of Araneidae spiders. The family composition of spiders represented by adults in our samples varied very little among microhabitats. Theridiidae predominated in all, followed by Linyphiidae. Both are found in the forest interior. Theridiids are known to occupy a variety of ecological niches (SILVA 1996, SILVA & CODDINGTON 1996), which could possibly explain their wide distribution across microhabitats in our data.

The frequency of individuals of some families was higher in the forest interior than in the forest edges (e.g., Anyphaenidae, Linyphiidae, Mimetidae, Pholcidae, Theridiosomatidae). The great presence of Theridiosomatidae there substantiates the results of CODDINGTON (1986), according to whom these spiders inhabit mainly dark and humid sites within forests. At the Maquiné River, the river edge has a much more closed forest with high vegetation density. GONÇALVES-SOUZA et al. (2007) also found more Theridiosomatidae in the forest interior than at the forest edges of the Atlantic forest of south-eastern Brazil, also recording Linyphiidae with many species exclusive to the forest interior.

Members of Salticidae showed no clear microhabitat preference in our samples. In contrast, in previous studies this family was collected more often at the edges of forests (GONÇALVES-SOUZA et al. 2007, OLIVEIRA-ALVES et al. 2005). These spiders have great visual accuracy, and can use the light incidence at the forest edges to locate and capture prey (ROMERO & VASCONCELLOS-NETO 2005).

Two families represented in our samples have been infrequently collected as part of other inventories in the South. Mysmenidae was represented by *T. cantareira*. Synotaxidae, represented by *S. longicaudatus*, had only been recorded from Rio Grande do Sul before by SILVA & ARAÚJO (2005) having also been found in the Atlantic forest of south-eastern Brazil (GONÇALVES-SOUZA et al. 2007).

Besides the high species richness recorded in the present study, and new records for Rio Grande do Sul and Brazil, new species and new records had been previously reported from the same data by RODRIGUES & MENDONÇA (2011) for Araneidae; RODRIGUES & MARQUES (2010) for *Phoroncidia* (Theridiidae), RODRIGUES & OTT (2010) for *Psilocymbium* (Linyphiidae) and RODRIGUES & BRESCOVIT (2015) for *Thymoites* (Theridiidae).

The composition of spider species differed among river basins. A number of factors such as geographical distance between basins, composition of the vegetation, climatic factors and biome may be plausible explanations for it. Piratini and Camaquã, which are very similar to each other, are within the Pampa biome. Given that the Maquiné River Basin is well within the Atlantic forest, it was expected that its fauna would differ from the other basins. The Atlantic forest is a peculiar biome, with high diversity levels and heterogeneous areas and habitats that reflect different physical environmental characteristics (CONSERVATION INTERNATIONAL et al. 2000, TABARELLI et al. 2005).

Habitat heterogeneity could be responsible for the number of exclusive spider species at the Maquiné River basin. The Sinos River is at the limit between the Pampa and the Atlantic forest biomes. Even though the forest of the Sinos River is not continuous, our sampling site includes a fraction of the forest that is in good condition. These characteristics of the Sinos basin may explain the faunistic differences with respect to Maquiné.

Even though some species seemed to prefer one of the three forest microhabitats, and the slight tendency for edge microhabitats to share more species, the overall species composition did not significantly differ among them. In contrast, the results of OLIVEIRA-ALVES et al. (2005), which were obtained with the same collecting method as ours, indicated low similarity between the spider fauna of the forest interior and the edges of an Atlantic forest fragment in north-eastern Brazil. They suggested that the faunistic differences in spider assemblages were due to the differences in vegetation at the edges and forest interior. When different environments are compared, variations in species composition are usually stronger.

An alternative explanation to vegetation structure determining faunistic differences is that the basins rest on different phytogeographic regions, thus supporting different plant species/taxa. This would affect spiders more strongly, and in a different way, than vegetation structure *per se* (RODRIGUES et al. 2014). Spider assemblages can be notably dependent on regional aspects, and dissimilarities among basins might indicate an association between spiders and particular vegetation subtypes (RAIZER et al. 2005, RINALDI & TRINCA 2008). A second possibility would be differences in the conservation status of the landscape of each basin, making it difficult to compare them. However, our data on vegetation density and complexity (not shown, partial results in RODRIGUES & MENDONÇA 2012) in these riparian forests of Rio Grande do Sul do not support that the sampled riparian forests are similar in structure and density.

We had already shown that vegetation structure does not affect spider functional diversity: guild abundance and distribution in these same riparian forests do not respond to standard measurements of vegetation structure and density (RODRIGUES & MENDONÇA 2012). Now we can make a stronger case for this argument, since in our results the three microhabitats do not differ in their spider assemblages.

The richness of the riparian forests and their distinct spider composition among river basins adds weight to the view that these forests are very diversified, and that they need more thorough scientific exploration. A better understanding the role of riparian forests as faunal corridors and their relationship with nearby continuous forests could help subsidize their conservation and consequently the persistence of their functions in maintaining biodiversity. Differences in spider composition in a large spatial scale probably reflect regional variations in a series of environmental factors, also leading to a high conservation value for the riparian forests of each drainage basin, each having a distinct spider fauna.

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Appendix 1. Species/morphospecies list for spiders sampled in riparian forests and respective microhabitats (edges and forest interior) in southern Brazil. (GE) Grassland edge, (RE) river edge, (FI) forest interior.

Taxa	Riparian forests/microhabitats												Total	%	
	Piratini			Camaquã			Sinos			Maquiné					
	RE	FI	GE	RE	FI	GE	RE	FI	GE	RE	FI	GE			
Amaurobiidae															
<i>Amaurobiidae</i> undet.		1		2			1							4	0.05
Anyphaenidae															
<i>Anyphaenoides clavipes</i> (Mello-Leitão, 1922)			2				1		3		2			8	0.09
<i>Arachosia praesignis</i> (Keyserling, 1891)	7		1											8	0.09
<i>Arachosia</i> sp.	1													1	0.01
<i>Aysha borgmeyer</i> (Mello-Leitão, 1926)		3	1			4								8	0.09
<i>Aysha chicama</i> Brescovit, 1992				3										3	0.03
<i>Aysha ericae</i> Brescovit, 1992						2		2		1				5	0.06
<i>Aysha helvola</i> (Keyserling, 1891)											1			1	0.01
<i>Aysha montenegro</i> Brescovit, 1992		1			3	2	1	6						13	0.15
<i>Aysha rubromaculata</i> (Keyserling, 1891)				1						1				2	0.02
<i>Aysha triunfo</i> Brescovit, 1992	1						2		2	1			2	8	0.09
<i>Aysha</i> sp. 1	3													3	0.03
<i>Aysha</i> sp. 2		2	5											7	0.08
<i>Aysha</i> sp. 3	1		1											2	0.02
<i>Aysha</i> sp. 4	1	12			3	1			2					19	0.21
<i>Aysha</i> sp. 5	1		3							1				5	0.06
<i>Aysha</i> sp. 6							1							1	0.01
<i>Aysha</i> sp. 7		1			1			2						4	0.05
<i>Aysha</i> sp. 8											1			1	0.01
<i>Jessica osoriana</i> (Mello-Leitão, 1922)										1				1	0.01
<i>Jessica</i> sp.	1					1								2	0.02
<i>Patrera longipes</i> (Keyserling, 1891)		7		1	5	2	1				4			20	0.23
<i>Patrera procera</i> (Keyserling, 1891)		1					1	2		1				5	0.06
<i>Sanogasta maculatipes</i> (Keyserling, 1878)	1													1	0.01
<i>Sanogasta maculosa</i> (Nicolet, 1849)						1								1	0.01
<i>Sanogasta</i> sp. 1						1								1	0.01
<i>Sanogasta</i> sp. 2												1		1	0.01
<i>Sanogasta</i> sp. 3	1	1									1			3	0.03
<i>Tasata variolosa</i> Mello-Leitão, 1943	3	3		1	5	1								13	0.15
<i>Tasata</i> sp. 1		1				1			1				1	4	0.05
<i>Tasata</i> sp. 2	1		1											2	0.02
<i>Tasata</i> sp. 3											1			1	0.01
<i>Wulfilia albus</i> (Mello-Leitão, 1945)		4			1	1	2	2	1	5			1	17	0.19
<i>Wulfilopsis</i> sp.				4	6	1								11	0.12
<i>Wulfilopsis tripunctata</i> (Mello-Leitão, 1947)										5	12			17	0.19
<i>Xiruana gracilipes</i> (Keyserling, 1891)	1		3											4	0.05
<i>Xiruana</i> sp.		1		1					1					3	0.03
Araneidae															
<i>Acasesia graciosa</i> Lise & Braul, 1995					1								2	3	0.03
<i>Alpaida alticeps</i> (Keyserling, 1880)											2	2		4	0.05
<i>Alpaida citrina</i> (Keyserling, 1892)													10	10	0.11
<i>Alpaida erica</i> Levi, 1988				1										1	0.01
<i>Alpaida grayi</i> (Blackwall, 1863)												5		5	0.06
<i>Alpaida lomba</i> Levi, 1988				1										1	0.01
<i>Alpaida nonoai</i> Levi, 1988						2								2	0.02
<i>Alpaida octolobata</i> Levi, 1988		4			12									16	0.18
<i>Alpaida pedro</i> Levi, 1988					1						2			3	0.03
<i>Alpaida truncata</i> (Keyserling, 1865)								1						1	0.01
<i>Araneus omnicolor</i> (Keyserling, 1893)	1	2		1	1				2	1	5			13	0.15
<i>Araneus unanimus</i> (Keyserling, 1880)			4	2	1	1								8	0.09

Continues

Appendix 1. Continued.

Taxa	Riparian forests/microhabitats												Total	%
	Piratini			Camaquã			Sinos			Maquiné				
	RE	FI	GE	RE	FI	GE	RE	FI	GE	RE	FI	GE		
<i>Araneus uniformis</i> (Keyserling, 1880)			2										2	0.02
<i>Araneus venatrix</i> (C.L. Koch, 1839)		1								1	1	1	4	0.05
<i>Araneus vincibilis</i> (Keyserling, 1893)		3					2	1					6	0.07
<i>Bertrana rufostriata</i> Simon, 1893			1									1	7	0.08
<i>Cyclosa camargoi</i> Levi, 1999						1							1	0.01
<i>Cyclosa diversa</i> (O.P.-Cambridge, 1894)							1						1	0.01
<i>Cyclosa fililineata</i> Hingston, 1932		2			1			7					10	0.11
<i>Cyclosa inca</i> Levi, 1999				2									2	0.02
<i>Cyclosa machadinho</i> Levi, 1999			1		1		1	5	1	1	6		16	0.18
<i>Cyclosa morretes</i> Levi, 1999			1		1								2	0.02
<i>Eustala albiventer</i> (Keyserling, 1884)	2					1							3	0.03
<i>Eustala crista</i> Poeta, Marques & Buckup, 2010					1								1	0.01
<i>Eustala levii</i> Poeta, Marques & Buckup, 2010			4										4	0.05
<i>Eustala palmares</i> Poeta, Marques & Buckup, 2010	3		4									1	8	0.09
<i>Eustala photographica</i> Mello-Leitão, 1944	10		1	3									14	0.16
<i>Eustala saga</i> (Keyserling, 1893)												1	1	0.01
<i>Eustala taquara</i> (Keyserling, 1892)			5	4		12	8		9			3	41	0.46
<i>Eustala</i> sp. 1												1	1	0.01
<i>Eustala</i> sp. 2				1									1	0.01
<i>Eustala</i> sp. 3									1				1	0.01
<i>Gasteracantha cancriformis</i> (Linnaeus, 1767)	2	1	2				1					3	9	0.1
<i>Hypognatha viamao</i> Levi, 1996		1	1							1	1		4	0.05
<i>Larinia montecarlo</i> (Levi, 1998)					1		1						2	0.02
<i>Mangora fundo</i> Levi, 2007	1		3									1	5	0.06
<i>Mangora lactea</i> Mello-Leitão, 1944		1	2										3	0.03
<i>Mangora melanocephala</i> (Taczanowski, 1878)							1		3				4	0.05
<i>Mangora missa</i> Levi, 2007											1		1	0.01
<i>Mangora piratini</i> Rodrigues & Mendonça, 2011		1											1	0.01
<i>Mangora strenua</i> (Keyserling, 1893)	11	68	8	8	21	1	1	9		3	3	1	134	1.51
<i>Mecynogea bigibba</i> Simon, 1903						1	1		1				3	0.03
<i>Metazygia floresta</i> Levi, 1995									1				1	0.01
<i>Metazygia genialis</i> (Keyserling, 1892)						1							1	0.01
<i>Metazygia lagiana</i> Levi, 1995							1						1	0.01
<i>Metepeira compsa</i> (Chamberlin, 1916)									1				1	0.01
<i>Metepeira glomerabilis</i> (Keyserling, 1892)									1				1	0.01
<i>Micrathena furva</i> (Keyserling, 1892)		1											1	0.01
<i>Micrathena guanabara</i> Levi, 1985		2			2			6		1	2		13	0.15
<i>Micrathena jundiai</i> Levi, 1985												2	2	0.02
<i>Micrathena lata</i> Chickering, 1960			1										1	0.01
<i>Micrathena nigrichelis</i> Chickering, 1960											1		1	0.01
<i>Micrathena spitzii</i> Mello-Leitão, 1932	3	24	3	6	3	1				1			41	0.46
<i>Ocrepeira fiebrigi</i> (Dahl, 1906)									1				1	0.01
<i>Ocrepeira galianoae</i> Levi, 1993	2	2	4										8	0.09
<i>Ocrepeira gnomo</i> (Mello-Leitão, 1943)	1		2	1	1						1		6	0.07
<i>Ocrepeira malleri</i> Levi, 1993				1									1	0.01
<i>Parawixia audax</i> (Blackwall, 1863)					1		1			3		2	7	0.08
<i>Parawixia velutina</i> (Taczanowski, 1878)								1					1	0.01
<i>Scoloderus cordatus</i> (Taczanowski, 1879)	1	4	14	8	4	16	1	14	1	4	2		69	0.78
<i>Testudinaria lemniscata</i> (Simon, 1893)												10	10	0.11
<i>Testudinaria quadripunctata</i> Taczanowski, 1879												1	1	0.01
<i>Verrucosa meridionalis</i> (Keyserling, 1892)											3		3	0.03
<i>Verrucosa undecimvariolata</i> (O.P.-Cambridge, 1889)			3										3	0.03
<i>Wagneriana taim</i> Levi, 1991				2									2	0.02

Continues

Appendix 1. Continued.

Taxa	Riparian forests/microhabitats												Total	%				
	Piratini			Camaquã			Sinos			Maquiné								
	RE	FI	GE	RE	FI	GE	RE	FI	GE	RE	FI	GE						
Clubionidae																		
<i>Elaver brevipes</i> (Keyserling, 1891)												1			1	0.01		
Corinnidae																		
<i>Castianeira</i> sp.	1		1												2	0.02		
Deinopidae																		
<i>Deinopis amica</i> Schiapelli & Gerschman, 1957			1			2			2			1		1	7	0.08		
<i>Deinopis</i> sp. 1									1					1	2	0.02		
<i>Deinopis</i> sp. 2						1									1	0.01		
Dictynidae																		
Dictynidae undet.														1	1	0.01		
Eutichuridae																		
<i>Cheiracanthium inclusum</i> (Hentz, 1847)	6		1			1						4		2	14	0.16		
<i>Eutichurus ravidus</i> Simon, 1896														1	1	0.01		
Gnaphosidae																		
<i>Zimiroemus montenegro</i> Buckup & Brescovit, 1993														1	1	0.01		
Hahniidae																		
<i>Hahnia</i> sp.												32	16	8	56	0.63		
Linyphiidae																		
<i>Anodoration claviferum</i> Millidge, 1991						12		1	4		9	13	2	4	1	10	56	0.63
<i>Asemostera latithorax</i> (Keyserling, 1886)						1										1	0.01	
<i>Asemostera tacuapi</i> Rodrigues, 2007						1					3		1	1	3	9	0.1	
<i>Dubiaranea</i> sp.														2	1	3	0.03	
<i>Erigone</i> sp.	2		2		1		6		1	2	6			1		21	0.24	
<i>Erigoninae</i> undet.	1															1	0.01	
<i>Laminacauda montevidensis</i> (Keyserling, 1878)			1		3											4	0.05	
<i>Laminacauda</i> sp.												1				1	0.01	
<i>Lepthyphantes</i> sp. 1					1		1						1			3	0.03	
<i>Lepthyphantes</i> sp. 2						1						4				5	0.06	
<i>Lepthyphantes</i> sp. 3						1										1	0.01	
<i>Linyphiinae</i> undet.														1		1	0.01	
<i>Lygarina</i> sp. 1	1		1													2	0.02	
<i>Lygarina</i> sp. 2													1	5		6	0.07	
<i>Lygarina sylvicola</i> Millidge, 1991	11		6				5									22	0.25	
<i>Meioneta</i> sp. 1	3	1			3	4	2		2		1					16	0.18	
<i>Meioneta</i> sp. 2		2	1		1		1									5	0.06	
<i>Meioneta</i> sp. 3										1						1	0.01	
<i>Meioneta</i> sp. 4												3				3	0.03	
<i>Mermessus</i> sp.	1														1	2	0.02	
<i>Neomaso</i> sp.	2	1														3	0.03	
<i>Notiohyphantes excelsus</i> (Keyserling, 1886)	1											2				3	0.03	
<i>Psilocymbium lineatum</i> (Millidge, 1991)					1		1									2	0.02	
<i>Scolecurea cambara</i> Rodrigues, 2005						1										1	0.01	
<i>Scolecurea parilis</i> Millidge, 1991	3	2														5	0.06	
<i>Smermisia</i> sp.							2									2	0.02	
<i>Sphecozone diversicolor</i> (Keyserling, 1886)							1						1			2	0.02	
<i>Sphecozone ignigena</i> (Keyserling, 1891)	9	2			8	2	1				1				2	25	0.28	
<i>Sphecozone personata</i> (Simon, 1894)										1	1	293	598	329	1222	13.8		
<i>Sphecozone rostrata</i> Millidge, 1991					2					15	22		55	6	100	1.13		
<i>Sphecozone</i> sp. 1						1										1	0.01	
<i>Sphecozone</i> sp. 2															1	1	0.01	
<i>Sphecozone</i> sp. 3												1				1	0.01	
<i>Sphecozone</i> sp. 4	1															1	0.01	
<i>Sphecozone</i> sp. 5	1															1	0.01	

Continues

Appendix 1. Continued.

Taxa	Riparian forests/microhabitats												Total	%
	Piratini			Camaquã			Sinos			Maquiné				
	RE	FI	GE	RE	FI	GE	RE	FI	GE	RE	FI	GE		
<i>Sphecozone</i> sp. 6			4						1				5	0.06
<i>Triplogyna ignitula</i> (Keyserling, 1886)	2			2		1							5	0.06
<i>Tutaibo</i> aff. <i>debilipes</i>								6					6	0.07
<i>Tutaibo rusticellus</i> (Keyserling, 1891)						5	2		1				8	0.09
<i>Tutaibo velox</i> (Keyserling, 1886)						1							1	0.01
<i>Tutaibo</i> sp. 1	4			4	5	2	1		1				17	0.19
<i>Tutaibo</i> sp. 2	2				1	1	1						5	0.06
<i>Tutaibo</i> sp. 3	32		1	10	2	15							60	0.68
<i>Tutaibo</i> sp. 4									4				4	0.05
<i>Tutaibo</i> sp. 5					1		1						2	0.02
Mimetidae														
<i>Gelanor altithorax</i> Keyserling, 1893					3	2		2					7	0.08
<i>Gelanor zonatus</i> (C. L. Koch, 1845)	1	9	2	1	4	2	1	3	1				24	0.27
Mimetinae undet. 1		3		2	49	3		8					65	0.73
Mimetinae undet. 2		12			6	1		5		1	3		28	0.32
Mimetinae undet. 3											1	1	2	0.02
<i>Mimetus hieroglyphicus</i> (Mello-Leitão, 1929)	2		1										3	0.03
Mysmenidae														
<i>Trogloneta cantareira</i> Brescovit & Lopardo, 2008		1		1	1	2							5	0.06
Nephiliidae														
<i>Nephila clavipes</i> (Linnaeus, 1767)	3	3		4	3	4	6	16	2		1	2	44	0.50
Oonopidae														
<i>Gamasomorpha</i> sp. 1		2				1							3	0.03
<i>Gamasomorpha</i> sp. 2						1					1	2	4	0.05
<i>Oonops</i> sp.								1			2		3	0.03
<i>Orchestina</i> sp. 1	13	2	3	7	13		3		2	5	13	1	62	0.70
<i>Orchestina</i> sp. 2										1		1	2	0.02
<i>Orchestina</i> sp. 3					1								1	0.01
Oxyopidae														
<i>Hamataliwa</i> sp.									2			1	3	0.03
<i>Oxyopes</i> sp.						1	1	5	1				8	0.09
Philodromidae														
<i>Berlandiella magna</i> Mello-Leitão, 1929							2	3	6		8	7	26	0.29
<i>Berlandiella</i> sp. 1										1			1	0.01
<i>Berlandiella</i> sp. 2						1							1	0.01
Philodromidae undet.										1		1	2	0.02
Pholcidae														
<i>Mesabolivar</i> aff. <i>cyaneomaculatus</i>		1		1	2	2							6	0.07
<i>Mesabolivar luteus</i> (Keyserling, 1891)							2	8	1				11	0.12
<i>Metagonia argentinensis</i> Mello-Leitão, 1945							4	1	4				9	0.10
<i>Metagonia</i> sp.				1	47	8				17	64	3	140	1.58
<i>Tupigea paula</i> Huber, 2000					4								4	0.05
<i>Tupigea</i> sp.					1		1						2	0.02
Salticidae														
<i>Acragas nigromaculatus</i> (Mello-Leitão, 1922)									1				1	0.01
<i>Ashtabula</i> sp. 1		5		4	3								12	0.14
<i>Ashtabula</i> sp. 2						1							1	0.01
<i>Atelurius segmentatus</i> Simon, 1901				2									2	0.02
<i>Beata</i> aff. <i>maccuni</i>							1						1	0.01
<i>Beata</i> sp.									1				1	0.01
<i>Chira</i> sp.											1		1	0.01
<i>Chira thysbe</i> Simon, 1902	7		2	1	1		7		3			2	23	0.26
<i>Chirothecia semiornata</i> Simon, 1901			1	2		6				1		2	12	0.14

Continues

Appendix 1. Continued.

Taxa	Riparian forests/microhabitats												Total	%
	Piratini			Camaquã			Sinos			Maquiné				
	RE	FI	GE	RE	FI	GE	RE	FI	GE	RE	FI	GE		
<i>Chirothecia</i> sp. 1				1	1	6							8	0.09
<i>Chirothecia</i> sp. 2									1				1	0.01
<i>Coryphasia albibarbis</i> Simon, 1902				1	1		1	3	2			1	9	0.10
<i>Coryphasia</i> sp. 1											1		1	0.01
<i>Coryphasia</i> sp. 2					7	3							10	0.11
<i>Corythalia</i> sp. 1	2			2									4	0.05
<i>Corythalia</i> sp. 2							1						1	0.01
<i>Cotinusa</i> aff. <i>deserta</i>	5	8	3	9	17	5				26	25	2	100	1.13
<i>Cotinusa trifasciata</i> (Mello-Leitão, 1943)	9	22	27	14	29	6	14	19	2	36	26		204	2.30
<i>Cotinusa</i> sp. 1									1	1			2	0.02
<i>Cotinusa</i> sp. 2						3							3	0.03
<i>Cotinusa</i> sp. 3			2		1	2				6		1	12	0.14
<i>Cotinusa</i> sp. 4	1				1	2	1			1			6	0.07
<i>Cotinusa</i> sp. 5									1				1	0.01
<i>Cylistella cuprea</i> (Simon, 1864)				7	27	1				4	11		50	0.56
<i>Cylistella</i> sp. 1		1											1	0.01
<i>Cylistella</i> sp. 2										1		1	2	0.02
<i>Cylistella</i> sp. 3								1		3	7	1	12	0.14
<i>Dendryphantes</i> sp.	1												1	0.01
<i>Euophrys saitiformis</i> Simon, 1901					1								1	0.01
<i>Gastromicans albopilosa</i> (Simon, 1903)	1								1				2	0.02
<i>Hasarius lisei</i> Vianna & Soares, 1982						1							1	0.01
<i>Hasarius</i> sp.	9		5	9		4	6	1	13				47	0.53
<i>Lyssomanes leucomelas</i> Mello-Leitão, 1917										1			1	0.01
<i>Lyssomanes nigrofimbriatus</i> Mello-Leitão, 1940				4	1	3	2		3				13	0.15
<i>Lyssomanes pauper</i> Mello-Leitão, 1945	15		6										21	0.24
<i>Mopiopia labyrinthea</i> (Mello-Leitão, 1947)							21	10	4	8	13	2	58	0.66
<i>Mopiopia</i> sp.								1		4	2		7	0.08
<i>Myrmarachne</i> sp.											1	2	3	0.03
<i>Noegus australis</i> (Mello-Leitão, 1941)					8		4	7			6		25	0.28
<i>Paradescanso</i> aff. <i>fallax</i>					1	1							2	0.02
<i>Rudra</i> sp.	2		1			1							4	0.05
<i>Sarinda</i> sp.										3			3	0.03
<i>Sassacus</i> sp. 1							1		3			10	14	0.16
<i>Sassacus</i> sp. 2												1	1	0.01
<i>Synemosyna aurantiaca</i> (Mello-Leitão, 1917)	1		1									1	3	0.03
<i>Synemosyna laurietta</i> Peckham & Peckham, 1892												2	2	0.02
<i>Tacuna delecta</i> Peckham & Peckham, 1901				4		2	3		1			13	23	0.26
<i>Tariona bruneti</i> Simon, 1903							1	1		3	5		10	0.11
<i>Thiodina robusta</i> Mello-Leitão, 1945						1			1			1	3	0.03
<i>Tulpilus gauchus</i> Vianna & Soares, 1983	2	2		1	1								6	0.07
Unidentati undet.							1					1	2	0.02
<i>Vinnius</i> sp.									1				1	0.01
<i>Vinnius uncatus</i> Simon, 1902								2				5	7	0.08
Scytodiidae														
<i>Scytodes maquine</i> Rheims & Brescovit, 2009										2	7	3	12	0.14
Senoculiidae														
<i>Senoculus purpureus</i> (Simon, 1880)	2		1				2	1	1	1			8	0.09
<i>Senoculus</i> sp.											1		1	0.01
Sparassidae														
<i>Caayguara album</i> (Mello-Leitão, 1918)				1	1								2	0.02
<i>Polybetes germani</i> Simon, 1896											1	1	2	0.02
<i>Polybetes rubrosignatus</i> Mello-Leitão, 1943							3	2	2		1		8	0.09

Continues

Appendix 1. Continued.

Taxa	Riparian forests/microhabitats												Total	%
	Piratini			Camaquã			Sinos			Maquiné				
	RE	FI	GE	RE	FI	GE	RE	FI	GE	RE	FI	GE		
<i>Polybetes</i> sp.										1			1	0.01
Synotaxidae														
<i>Synotaxus longicaudatus</i> (Keyserling, 1891)											3	1	4	0.05
Trachelidae														
<i>Meriola cetiformis</i> (Strand, 1908)	1												1	0.01
<i>Trachelas</i> sp. 1			1	1									2	0.02
<i>Trachelas</i> sp. 2				1			1	1				1	4	0.05
Trachelinae undet.		1											1	0.01
<i>Trachelopachys cingulipes</i> (Simon 1886)	3												3	0.03
<i>Trachelopachys keyserlingi</i> (Roewer, 1951)											1	3	4	0.05
Tetragnathidae														
<i>Chrysometa aramba</i> Levi, 1986										1			1	0.01
<i>Chrysometa boraceia</i> Levi, 1986			2		2								4	0.05
<i>Dolichognatha pinheiral</i> Brescovit & Cunha, 2001				1	2						1	1	5	0.06
<i>Glenognatha lacteovittata</i> (Mello-Leitão, 1944)			1										1	0.01
<i>Leucauge roseosignata</i> Mello-Leitão, 1943	1	15	2	4	7	8	2	1	2	1	2	1	46	0.52
<i>Leucauge</i> sp. 1		8	1		1						1		11	0.12
<i>Leucauge</i> sp. 2									1			1	4	0.05
<i>Leucauge</i> sp. 3										1			1	0.01
<i>Leucauge</i> sp. 4							1						1	0.01
<i>Leucauge</i> sp. 5										1			1	0.01
<i>Leucauge volupis</i> (Keyserling, 1893)										2	5		7	0.08
<i>Opas paranensis</i> (Mello-Leitão, 1937)				1	1			4		1	1	1	9	0.10
<i>Tetragnatha longidens</i> Mello-Leitão, 1945	5			20						1			26	0.29
<i>Tetragnatha</i> sp. 1	1	1	2										4	0.05
<i>Tetragnatha</i> sp. 2	1	1	6		1						2		11	0.12
<i>Tetragnatha</i> sp. 3		1					2			1			4	0.05
<i>Tetragnatha</i> sp. 4				1	1								2	0.02
<i>Tetragnatha</i> sp. 5											1		1	0.01
<i>Tetragnatha</i> sp. 6							2						2	0.02
<i>Tetragnatha</i> sp. 7												2	2	0.02
<i>Tetragnatha</i> sp. 8							1						1	0.01
Theridiidae														
<i>Anelosimus ethicus</i> (Keyserling, 1884)	5		1			2						1	9	0.10
<i>Anelosimus nigrescens</i> (Keyserling, 1884)	1		5			2				1		4	13	0.15
<i>Anelosimus</i> sp.						1							1	0.01
<i>Argyrodes elevatus</i> Taczanowski, 1873											1		1	0.01
<i>Ariamnes longissimus</i> Keyserling, 1891		2	2		1	2	2	1		4		1	15	0.17
<i>Chrosiothes niteroi</i> Levi, 1964		40	3		1								44	0.50
<i>Chrosiothes perfidus</i> Marques & Buckup, 1997		1		6	2								9	0.10
<i>Chryso compressa</i> (Keyserling, 1884)					1								1	0.01
<i>Chryso nigrosterna</i> Keyserling, 1891		15		1	3	13		16	1	34	11	27	121	1.37
<i>Chryso rubrovittata</i> (Keyserling, 1884)			13	1		1							15	0.17
<i>Chryso</i> sp. 1										14	16	1	31	0.35
<i>Chryso</i> sp. 2												1	1	0.01
<i>Coleosoma</i> sp.									1				1	0.01
<i>Craspedisia cornuta</i> (Keyserling, 1891)									1				1	0.01
<i>Cryptachaea altiventer</i> (Keyserling, 1884)	7		3	2	1	11	3	2	1	1		9	40	0.45
<i>Cryptachaea analista</i> (Levi, 1963)	1	1		1		4							7	0.08
<i>Cryptachaea bellula</i> (Keyserling, 1891)		1	13	2	1	2	1	2	1			1	24	0.27
<i>Cryptachaea cinnabarina</i> (Levi, 1963)				3	7	1		1			1		13	0.15
<i>Cryptachaea digitus</i> (Buckup & Marques, 2006)					1								1	0.01

Continues

Appendix 1. Continued.

Taxa	Riparian forests/microhabitats												Total	%
	Piratini			Camaquã			Sinos			Maquiné				
	RE	FI	GE	RE	FI	GE	RE	FI	GE	RE	FI	GE		
<i>Cryptachaea hirta</i> (Taczanowski, 1873)	4		3	1		15	1		5			7	36	0.41
<i>Cryptachaea isana</i> (Levi, 1963)				2		9							11	0.12
<i>Cryptachaea passiva</i> (Keyserling, 1891)	13	23	22	35	25	3	36	11	11	4	15	1	199	2.25
<i>Cryptachaea rioensis</i> (Levi, 1963)										1	3	1	5	0.06
<i>Cryptachaea taim</i> (Buckup & Marques, 2006)				1	1	1							3	0.03
<i>Cryptachaea triguttata</i> (Keyserling, 1891)					10	1	3	23	1	8	10		56	0.63
<i>Dipoena atlantica</i> Chickering, 1943	1		1										2	0.02
<i>Dipoena cordiformis</i> Keyserling, 1886												1	1	0.01
<i>Dipoena ira</i> Levi, 1963			5			2		4		4	6		21	0.24
<i>Dipoena pumicata</i> (Keyserling, 1886)		2		1		1						1	5	0.06
<i>Dipoena pusilla</i> (Keyserling, 1886)									4		2	1	7	0.08
<i>Dipoena santacatarinae</i> Levi, 1963				9	23	5	36	24	12	13	2	5	129	1.46
<i>Dipoena</i> sp. 1	1			2	1	4	1	1				1	11	0.12
<i>Dipoena</i> sp. 2											9		9	0.10
<i>Dipoena</i> sp. 3										3	1		4	0.05
<i>Dipoena</i> sp. 4				1									1	0.01
<i>Dipoena taeniatipes</i> Keyserling, 1891	1						2		1	2		1	7	0.08
<i>Dipoena variabilis</i> (Keyserling, 1886)										2	3	1	6	0.07
<i>Echinotheridion</i> sp.					2								2	0.02
<i>Emertonella taczanowskii</i> (Keyserling, 1886)			6								1	17	24	0.27
<i>Episinus teresopolis</i> Levi, 1964				5	5	45							55	0.62
<i>Episinus</i> sp. 1										1			1	0.01
<i>Episinus</i> sp. 2	6	1	13				5		6				31	0.35
<i>Episinus</i> sp. 3										12	24	3	39	0.44
<i>Exalbidion</i> sp.	6	2	23	4	4	5	5	1		5	12		67	0.76
<i>Faiditus affinis</i> (O.P.-Cambridge, 1880)	4	43		14	19	3	3	16		3	2	1	108	1.22
<i>Faiditus alticeps</i> (Keyserling, 1891)								1					1	0.01
<i>Faiditus americanus</i> (Taczanowski, 1874)	6		4	1									11	0.12
<i>Faiditus plaumanni</i> (Exline & Levi, 1962)	5	2	17			1	8			3			36	0.41
<i>Faiditus sicki</i> (Exline & Levi, 1962)								1					1	0.01
<i>Faiditus striatus</i> (Keyserling, 1891)	3	35		4	14	1				5	22		84	0.95
<i>Faiditus</i> sp. 1				5	25	3		8		1			42	0.47
<i>Faiditus</i> sp. 2								2		2	3		7	0.08
<i>Faiditus</i> sp. 3											1		1	0.01
<i>Faiditus</i> sp. 4	1			1									2	0.02
<i>Hadrotarsinae</i> undet.											1		1	0.01
<i>Hetschkia gracilis</i> Keyserling, 1886		22	9	20	54	62	3			29	77	24	300	3.39
<i>Kochiura olaup</i> (Levi, 1963)	12	4	16	6	3	13	2		2		8	14	80	0.90
<i>Neospintharus rioensis</i> (Exline & Levi, 1962)	2	1	1		1	2	1		2				10	0.11
<i>Parasteatoda tessellata</i> (Keyserling, 1884)	5	1	12	1			7	1	15			1	43	0.49
<i>Phoroncidia piratini</i> Rodrigues & Marques, 2010	1	1	2										4	0.05
<i>Phoroncidia reimoseri</i> Levi, 1964					4	2	21	82	3	7	20		139	1.57
<i>Phoroncidia</i> sp. 1								1			1		2	0.02
<i>Phoroncidia</i> sp. 2		1	6										7	0.08
<i>Phycosoma alta</i> (Keyserling, 1886)	11		54	6	27	22	21	51	7				199	2.25
<i>Rhomphaea Braziliensis</i> Mello-Leitão, 1920	15	29	6	10	33	8		2		2	1		106	1.20
<i>Rhomphaea</i> sp. 1				1		1				2	1	1	6	0.07
<i>Rhomphaea</i> sp. 2						1					1	3	5	0.06
<i>Spintharus gracilis</i> Keyserling, 1886				3	3	3	26	29	44	89	111	17	325	3.67
<i>Tekellina guaiba</i> Marques & Buckup, 1993	2	29	4	15	8	10	2	1		8	18	3	100	1.13
<i>Tekellina</i> sp. 1	1		1	4				1					7	0.08
<i>Tekellina</i> sp. 2					1								1	0.01
<i>Theridiidae</i> undet.										2			2	0.02

Continues

Appendix 1. Continued.

Taxa	Riparian forests/microhabitats												Total	%
	Piratini			Camaquã			Sinos			Maquiné				
	RE	FI	GE	RE	FI	GE	RE	FI	GE	RE	FI	GE		
<i>Theridion bergi</i> Levi, 1963						1							1	0.01
<i>Theridion biezankoi</i> Levi, 1963		1				6						2	9	0.10
<i>Theridion calcynatum</i> Holmberg, 1876	31	50	51	30	19	17							198	2.24
<i>Theridion eremum</i> Levi, 1963										1			1	0.01
<i>Theridion filum</i> Levi, 1963	1					7	8		1				17	0.19
<i>Theridion opolon</i> Levi, 1963			2					1					3	0.03
<i>Theridion plaumanni</i> Levi, 1963	11	3	56	17	3	20	3	3	18	2	20	22	178	2.01
<i>Theridion positivum</i> Chamberlin, 1924	30		41	4	3	11	7		7			3	106	1.20
<i>Theridion quadripartitum</i> Keyserling, 1891					10	7				7	4		28	0.32
<i>Theridion striatum</i> Keyserling, 1884				1	1	6							8	0.09
<i>Theridion teresae</i> Levi, 1963				16	36	12				5	16	3	88	0.99
<i>Theridion tinctorium</i> Keyserling, 1891	9		7			1							17	0.19
<i>Theridion</i> sp. 1	2	1	2	15	2	2						2	26	0.29
<i>Theridion</i> sp. 2		1											1	0.01
<i>Theridion</i> sp. 3	1												1	0.01
<i>Theridula gonygaster</i> (Simon, 1873)												1	1	0.01
<i>Thwaitesia affinis</i> O.P.-Cambridge, 1882								2		20	31	4	57	0.64
<i>Thymoites promatensis</i> Lise & Silva, 2009	2	2	9	5	112	18	10	272	6				436	4.93
<i>Thymoites</i> sp. 1	14	1	26			4		1					46	0.52
<i>Thymoites</i> sp. 2				1									1	0.01
<i>Thymoites</i> sp. 3	18		3			1	11						33	0.37
<i>Thymoites</i> sp. 4										13	2	8	23	0.26
<i>Thymoites</i> sp. 5	2	1	2										5	0.06
<i>Thymoites cristal</i> Rodrigues & Brescovit, 2015					1	1							2	0.02
<i>Thymoites camaqua</i> Rodrigues & Brescovit, 2015				2									2	0.02
<i>Tidarrem haemorrhoidale</i> (Bertkau, 1880)	3	5			6		3	8	1	1	4	1	32	0.36
<i>Wamba congener</i> O.P.-Cambridge, 1896	14	7	15	7	2	5					1	4	55	0.62
<i>Wamba crispulus</i> (Simon, 1895)	13	45	71	46	27	26	18	8	4	6		4	268	3.03
<i>Wirada</i> sp. 1				2						1	1		4	0.05
<i>Wirada</i> sp. 2				2	3				1				6	0.07
Theridiosomatidae														
<i>Chthonos</i> sp. 1								6		1	4		11	0.12
<i>Chthonos</i> sp. 2											1		1	0.01
<i>Chthonos</i> sp. 3						1							1	0.01
<i>Naatlo</i> sp. 1										9	2	2	13	0.15
<i>Naatlo</i> sp. 2	1												1	0.01
<i>Naatlo</i> sp. 3										1			1	0.01
<i>Theridiosoma chiripa</i> Rodrigues & Ott, 2005		1								1			2	0.02
<i>Theridiosoma</i> sp. 1				2									2	0.02
<i>Theridiosoma</i> sp. 2											1		1	0.01
<i>Theridiosoma</i> sp. 3		1											1	0.01
Theridiosomatidae undet.					3								3	0.03
<i>Wendilgarda</i> sp. 1		4		2	37	12	1	10	1	7		2	76	0.86
<i>Wendilgarda</i> sp. 2		13											13	0.15
Thomisidae														
<i>Epicadinus</i> sp. 1					1						1		2	0.02
<i>Epicadinus</i> sp. 2											1		1	0.01
<i>Epicadus heterogaster</i> (Guérin, 1829)												1	1	0.01
<i>Misumenoides</i> sp.						1							1	0.01
<i>Misumenops maculisparsus</i> Keyserling, 1891									1				1	0.01
<i>Misumenops pallens</i> (Keyserling, 1880)			2	1	1	1						1	6	0.07
<i>Misumenops</i> sp. 1										1			1	0.01
<i>Misumenops</i> sp. 2			3			1							4	0.05

Continues

Appendix 1. Continued.

Taxa	Riparian forests/microhabitats												Total	%
	Piratini			Camaquã			Sinos			Maquiné				
	RE	FI	GE	RE	FI	GE	RE	FI	GE	RE	FI	GE		
<i>Misumenops</i> sp. 3	1			1		4			1			1	8	0.09
<i>Misumenops</i> sp. 4												1	1	0.01
<i>Misumenops</i> sp. 5												1	1	0.01
<i>Onocolus infelix</i> Mello-Leitão, 1941					6			7					13	0.15
<i>Onocolus intermedius</i> (Mello-Leitão, 1929)	1			2	1	3	5	1	3				16	0.18
<i>Onocolus</i> sp. 1							1			1		3	5	0.06
<i>Onocolus</i> sp. 2				1	1	3	1	1		1			8	0.09
<i>Runcinioides argenteus</i> Mello-Leitão, 1929												2	2	0.02
<i>Sidymella longispina</i> (Mello-Leitão, 1943)					2					1			3	0.03
<i>Sidymella lucida</i> (Keyserling, 1880)	1												1	0.01
<i>Sidymella multispinulosa</i> (Mello-Leitão, 1944)				1		1			1				3	0.03
<i>Stephanopsis colatinae</i> Soares & Soares, 1946										1	2		3	0.03
<i>Synema nigrianum</i> Mello-Leitão, 1929					1								1	0.01
Thomisidae undet. 1		2				1							3	0.03
Thomisidae undet. 2				6	1	1							8	0.09
Thomisidae undet. 3										1			1	0.01
Thomisinae undet.				1	8					1			10	0.11
<i>Tmarus elongatus</i> Mello-Leitão, 1929											1		1	0.01
<i>Tmarus polyandrus</i> Mello-Leitão, 1929	9	7	7	4	16	3	2	1	1	1			51	0.58
<i>Tmarus pugnax</i> Mello-Leitão, 1929	7	6	4	4	1		2	2					26	0.29
<i>Tmarus striolatus</i> Mello-Leitão, 1929					1		1	1	1				4	0.05
<i>Tmarus</i> sp. 1								1	1				2	0.02
<i>Tmarus</i> sp. 2	1		1		4	2	2			3	5		18	0.20
<i>Tmarus</i> sp. 3			4										4	0.05
<i>Tmarus</i> sp. 4			4	1									5	0.06
<i>Tmarus</i> sp. 5	1												1	0.01
<i>Tmarus</i> sp. 6	8	2	7	5	2	5							29	0.33
<i>Tmarus</i> sp. 7			1										1	0.01
<i>Tmarus</i> sp. 8			1										1	0.01
<i>Tmarus</i> sp. 9					1						1		2	0.02
<i>Tmarus</i> sp. 10	2	1											3	0.03
<i>Tmarus</i> sp. 11								1					1	0.01
<i>Tmarus</i> sp. 12						1							1	0.01
<i>Tmarus</i> sp. 13							1						1	0.01
<i>Tmarus</i> sp. 14										1			1	0.01
<i>Tmarus</i> sp. 15												1	1	0.01
<i>Tmarus</i> sp. 16	1		1				1			3	1	1	8	0.09
Uloboridae														
<i>Conifaber yasi</i> Grismado, 2004				1			18	7		12	5		43	0.49
<i>Miagrammopes</i> sp. 1	6	45		7	22		12	23	2	9	12	2	140	1.58
<i>Miagrammopes</i> sp. 2											1		1	0.01
<i>Miagrammopes</i> sp. 3			1										1	0.01
<i>Miagrammopes</i> sp. 4							1						1	0.01
<i>Philoponella</i> gr. <i>fasciata</i>										3	9		12	0.14
<i>Uloborus</i> sp. 1	1						2	6	2				11	0.12
<i>Uloborus</i> sp. 2							1					1	2	0.02
<i>Uloborus</i> sp. 3			1				2	1					4	0.05
Total individuals	536	720	760	540	961	642	457	846	328	885	1467	709	8851	100
Total species	116	97	118	113	126	139	105	88	101	115	112	120		
Total individuals (riparian forest)		2016			2143			1631			3061			