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Phytoseiid mites associated with Asteraceae plants in the Pampa biome with description of two new species

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ABSTRACT

The Brazilian Pampa is predominantly composed of native grasslands with riparian and thickets forest formations, with rich and little known biodiversity of fauna, flora and fungi. The objective of this study was to report phytoseiid species associated with Asteraceae plants from eight physiographic regions of the Pampa biome. Collections were carried out seasonally from November 2021 to August 2022. In each physiographic region, ten species of Asteraceae were collected, totalling 320 samples. Data analysis was mainly based on the relationship between mite and plant. A total of 228 mite specimens of Phytoseiidae were found, represented by 26 species within 12 genera and three subfamilies. Two new species, *Amblyseius senecinis* **n. sp.** and *Typhlodromus (Anthoseius) bacchariae* **n. sp.** are described and a key to species from the *arizonicus* group is provided. The most abundant species were *Typhlodromalus aripo* De Leon, followed by *Euseius inouei* (Ehara & Moraes), *Phytoseius guianensis* De Leon, *Typhlodromus (Anthoseius) bacchariae* **n. sp.** And *Metaseiulus (Metaseiulus) eiko* (El-Banhawy).

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Introduction

The Pampa Biome is located in Northeastern Argentina, Uruguay, and the southern region of Brazil, covering around 62% of the area of the Rio Grande do Sul state. The biome comprises distinct fauna, fungal, and floristic ecosystems. The different ecosystems that compose the area are grouped as physiographic regions (Hasenack et al. 2010). The formations are predominantly constituted by low vegetation and shrubs but also have riparian forests on the banks of rivers and streams, hillside forests, ironwood forests, shrub formations, Butia palm groves, wetlands, and rocky outcrops. The vegetation of this environment is mainly characterized by: Poaceae, Asteraceae, Fabaceae, and Cyperaceae (Boldrini et al. 2010; Echer et al. 2015).

The Asteraceae in Brazil is represented by 27 tribes, 327 genera and 2,297 species, distributed in all biomes, with greater diversity in open formations such as Savannah, rocky grasslands, highland grasslands, and pampas temperate grasslands (Flora e Funga do Brazil 2022). In the Pampa biome, Asteraceae is represented by 117 genera and 427 species, mostly represented by *Baccharis* (69 species), *Mikania* (22 species), and *Senecio* (15 species) (Flora e Funga do Brasil 2022).

An extensive diversity of organisms is found associated with plants. Some arthropods, insects, fungi, microorganisms, *etc.* can even perform important ecological services (Altieri 1999). Among arthropods, groups of phytophagous mites such as Eriophyoidea, Tarsonemidae, Tenuipalpidae and Tetranychidae and predatory mites such as Ascidae, Cheyletidae, Iolinidae, Phytoseiidae, and Stigmaeidae can be found (Moraes and Flechtmann 2008; Krantz and Walter 2009). Predatory mite species, in general, are typically abundant and diverse, and frequently associated with soil; however, little is known about the diversity of mites on native plants in Brazil (Ferla and Moraes 2002; Feres et al. 2005).

Although primarily recognized as predators of small arthropods and nematodes, most phytoseiid also exhibit additional feeding behaviours including the consumption of fungi, plant exudates, pollen and some species are capable of extracting liquid from leaf cells (McMurtry et al. 2013). Among the Phytoseiidae already catalogued on the vegetation of the Brazilian Pampa the are *Amblydromalus limonicus* (Garman & McGregor), *Amblyseius tamatavensis* Blommers, *A. herbicolus* (Chant), and *Neoseiulus tunus* (De Leon) (Toldi et al. 2021).

Investigations of the diversity and seasonal dynamics of mite populations associated with native plants are essential for their effective utilization in the restoration of degraded ecosystems, as well as for advances in development of biological pest control methods in agroecosystems and for assessing the impacts caused by physical and biological alterations occurring in these habitats (Feres et al. 2010). Studies focusing on the mite fauna in native environments enable the discovery of new mite species with advantageous traits for applied biological control.

Therefore, the objective of this study is to characterize and describe new species of phytoseiid mites associated with Asteraceae plants in the physiographic regions of the Pampa biome, in the state of Rio Grande do Sul, Brazil.

Material and methods

Study area

The present study was carried out in eight physiographic regions of the Pampa biome: A1 - Mixed grasslands of Andropogoneae and composites; A2 - Field with goat's beard; A3 - Grassy field; A4 -Shrub field; A5 - Coastal field; A6 - Field with sands; A7 - Field with thorn; A8 - Field of shallow soils (Figure 1 and Table 1).

Sampling

Collections were carried out seasonally, from November 2021 and to August 2022. In each physiographic region, ten species of Asteraceae were collected, totalizing 320 samples. The plants were collected with pruning scissors, stored in individual plastic

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Figure 1. Map representing the distribution of the physiographic regions of the Pampa biome in Rio Grande do Sul, Brazil with the demarcation of collection points.

 Table 1. Geographical coordinates referring for the collection points in the subregions of the Pampa biome.

graphic regions	Municipalities	Geographical coordinates
Δ1	São Vicente do Sul	P1-29°43'10 14''S 054°46'47 26''W
//1	Suo vicente do Sui	P2-29°43'14 53''S 054°47'8 55''W
		P3-29°43′19.90″S, 054°49′42.45″W
A2	São Luiz Gonzaga	P4-28°28'35.32''S, 055°10'40.84''W
	5	P5-28°28'26.09''S, 055°10'10.33''W
		P6-28°26'42.93''S, 055°6'50.01''W
A3	Dom Pedrito	P7-30°50'25.86''S, 055°2'21.34''W
		P8-30°50′53.99″S, 055° 0′5.17″W
A4	Encruzilhada do Sul	P9-30°41′45.94″S, 052°43′54.02″W
		P10-30°41′57.14″S, 052°44′7.66″W
		P11-30°41′58.94″S, 052°44′9.72″W
A5	Capivari do Sul	P12-29°57′46.36′′S, 050°20′9.36′′W
		P13-29°58'32.90''S, 050°20'39.54''W
		P14-30° 8'57.93''S, 050°29'12.61''W
A6	São Francisco de Assis	P15-29°35′39.42′′S, 055°7′56.32′′W
A7	Nhu-porã	P16-28°57'14.45''S, 055°32'42.84''W
	São Borja	P17-28°38′58.15″S, 055°52′5.93″W
A8	Sant'Ana do Livramento	P18-30°48'24.50"'S, 055°36'54.86"W

bags, and identified according to the site and number of samples. The sampled material was sealed and stored in 100–litre Styrofoam thermal boxes with Illustrator[®] to preserve the plants. It was then transported to the Acarology Laboratory (Labacari) at the University of Vale do Taquari (Univates), where the samples were kept in a refrigerator at 10°C.

Laboratory activities

Physio-

The material was stored for a maximum period of one week. Each plant was examined under a dissecting stereo microscope (Zeiss) for one hour. All mites were collected using a Liner 5/0 fine tip brush and mounted on microscope slides in Hoyer's medium (Jeppson et al. 1975). The slides remained in a drying oven at

a temperature of 50-60°C for ten days for fixation, distension, specimen clarification and medium drying. Subsequently, the slides' borders were sealed and properly labelled with the location, season, date of collection, and plant's information. For the identification of mites at the species level, Optical Microscope with Phases Contrast (Zeiss) and internationally dichotomous keys were used. The mite classification system adopted in this study follows Chant and McMurtry (1994, 2007). The setal nomenclature follows Lindquist and Evans (1965) for the dorsal surface of the idiosoma, as modified by Rowell et al. (1978) and Chant and Yoshida-Shaul (1991) for the ventral surface. The setal pattern follows Chant and Yoshida-Shaul (1989), while solenostomes and poroids are designated according to Athias-Henriot (1975) and Moraes et al. (2022). Leg chaetotaxy is based on Evans (1963). All measurements are expressed in micrometres (µm). To illustrate the new species, photos were taken with the Zeiss Zen software, and the images were later vectorized in the Adobe Illustrator® program.

Data analysis

An interaction network analysis was performed using the Bipartite package (Dormann et al. 2008) of the R program (R Development Core Team 2010). A plant – mite bipartite network graph was generated. In addition, two indices were chosen (robustness and connectance).

Results

This is the first study on phytoseiid species in association with Asteraceae plants in the eight physiographic regions of the Brazilian pampa. A total of 228 mite specimens were found, comprising 26 species belonging to 12 genera of the subfamilies Amblyseiinae, Phytoseiinae, and Typhlodrominae (Table 2). Amblyseiinae expressed the greatest richness (20 species), followed by Typhlodrominae (five), and Phytoseiinae (one). Two

Table 2. Abundance and richness of phytoseiidae species in the eight physiographic regions: A1 - mixed field of andropogoneae and compounds; A2 - field with goat's beard; A3 - grass field; A4 - shrub field; A5 - coastal field; A6 - field with sand; A7 - field with thorns and A8 - field of shallow soils from the Pampa biome, Rio Grande do Sul, Brazil.

Subfamilies	Phytoseiid species	A1	A2	A3	A4	A5	A6	A7	A8	Total
Amblyseiinae	Amblydromalus spp.				1					1
,	Amblyseius senecinis n. sp.				4					4
	Amblyseius pravus				1					1
	Amblyseius vitis			1						1
	Arrenoseius gaucho			2						2
	Arrenoseius morgani			1						1
	Euseius citrifolius		2							2
	Euseius concordis					1				1
	Euseius inouei	3		11	15	4				33
	Euseius mesembrinus			2						2
	Euseius sibelius							2		2
	Iphiseiodes moraesi				1					1
	lphiseiodes zuluagai			1		2				3
	Neoseiulus californicus	6		1		5			1	13
	Neoseiulus tunus			6	3	2				11
	Proprioseiopsis citri								1	1
	Proprioseiopsis dominigos				1					1
	Proprioseiopsis ovatus			2						2
	Typhlodromalus aripo	52		19	1	13				85
	Typhlodromips mangleae	1				1				2
Phytoseiinae	Phytoseius guianensis	16	6	1	3	3	1			30
Typhlodrominae	Metaseiulus cornus								3	3
	Metaseiulus eiko						4	1	5	10
	Typhlodromus bacchariae n. sp.				9				5	14
	Typhlodromus ornatus						1			1
	Typhlodromus transvaalensis					1				1
	Abundance	78	8	47	39	32	6	3	15	228
	Frequency (%)	34,21	3,50	20,61	17,10	14,03	2,63	1,31	6,57	
	Richness	5	2	11	10	9	3	2	5	26

new species, Amblyseius senecinis **n. sp**. and Typhlodromus (Anthoseius) bacchariae **n. sp**. are described.

The most abundant species were *Typhlodromalus aripo* De Leon (85 specimens) followed by *Euseius inouei* (Ehara & Moraes) (33), *Phytoseius guianensis* (De Leon) (30), *Typhlodromus* (*Anthoseius*) *bacchariae* **n. sp**. (14), *Neoseiulus californicus* (McGregor) (13), *N. tunus* (De Leon) (11), and *Metaseiulus* (*Metaseiulus*) *eiko* (El – Banhawy) (10). The other species exhibited lower abundance.

With regard to the physiographic regions, A1 (34.21%) presented higher abundance, followed by A3 (20.61%), A4 (17.10%), and A5 (14.03%), and the sum of the values from the remaining regions showed an abundance of 14.01%. The region A3 (11 species) demonstrated the greatest species richness, followed by A4 (10), and A5 (9). The remaining regions exhibited five or fewer species.

Networks of mites and plants showed 50 interactions (Robustness = 0.568; Connectance = 0.110). Aspilia montevidensis (Spreng.) Kuntze stands out with seven interactions, followed by Senecio bonariensis Hook. & Arn., with six interactions, while Baccharis dracunculifolia DC., B. articulata (Lam.) Pers., and Campuloclinium macrocephalum (Less.) DC., had four interactions each. Regarding mites, T. aripo had 11 interactions with different plants, being most predominant on A. montevidensis, followed by N. californicus, with six interactions, E. inouei and P. guianensis, with five interactions each (Figure 2).

Amblyseiinae Muma

Genus Amblydromalus Chant & McMurtry

Amblydromalus sp.

Specimens examined – Encruzilhada do Sul – P9: Senecio brasiliensis (Spreng.) Less., XII–2021 (1 $^{\circ}$).

Measurements of a single female collected: dorsal shield 330 long and 220 wide at level of *s4*, *j1* 25, *j3* 44, *j4* 6, *j5* 5, *j6* 5, *J2* 9, *J5* 6, *z2* 10, *z4* 7, *z5* 6, *Z1* 10, *Z4* 10, *Z5* 68, *s4* 52, *S2* 11, *S4* 14, *S5* 13, *r3* 13, *R1* 9, *Sge* I 36, *Sge* II 30, *Sge* III 34, *Sti* III 27, *Sge* IV 48, *Sti* IV 36, *St* IV 75, *st1–st3* 65, *st2–st2* 69, *st5–st5* 77, ventrianal shield 115 long, 60 wide at *ZV2* level, and 64 wide at anus level; spermathecal calyx 20 long; fixed cheliceral digit 30 long, with nine teeth, movable digit 29 long, with three teeth.

Remarks. The exemplar reported in this manuscript belongs to the *limonicus* group, as it presents *Z4* much smaller than 40% of the distance between its base and the base of *Z5* (Chant and McMurtry 2005). However, the specimen did not correspond to any species of this group due to having the ventrianal shield with a constriction posterior to *JV1*, suggesting it is an undescribed species. However, since only one specimen was examined, it cannot be confirmed as a new species.

Genus Amblyseius Berlese

Amblyseius pravus Denmark, 1977

Amblyseius pravus - Denmark, 1977: 171. Amblyseius (Amblyseius) pravus - Denmark and Muma, 1989: 37. Amblyseius pravus - Moraes et al., 2013: 308.

Specimens examined – Encruzilhada do Sul – P9: *Baccharis trimera* (Less.) DC., XII–2021 (1 \mathcal{Q}).

Measurements of a single female collected: dorsal shield 433 long and 318 wide, *j*1 38, *j*3 51, *j*4 5, *j*5 5, *j*6 5, *J*2 7, *J*5 7, *z*2 12, *z*4 12, *z*5 6, *Z*1 9, *Z*4 140, *Z*5 294, *s*4 117, *S*2 12, *S*4 10, *S*5 12, *r*3 13, *R*1 12, *Sge* I 44, *Sge* II 47, *Sge* III 58, *Sti* III 39, *Sge* IV 138, *Sti* IV 88, *St* IV 70, *st1–st3* 79, *st2– st2* 90, *st5–st5* 91, ventrianal shield 147 long, 91 wide *ZV2* level, and 96 wide at anus level; spermathecal calyx 12 long; fixed cheliceral digit 46 long, with 10 teeth, movable digit 43 long, with three teeth.

Remarks. The species was reported in Brazil in *Vitis vinifera* L. (Vitaceae) (Silva et al. 2020). The measurements of the single female specimen examined differ from the redescription by Denmark and Muma (1989), in the length of *Z5*, *Sge* IV, *Sti* IV, and *St* IV (212, 64, 45, and 41, respectively). However, the measurements corroborate with those published in the redescription by Moraes et al. (2013).



Figure 2. Bipartite interaction network of the eight physiographic regions of the pampa biome. The bars on the left represent host plant species and the bars on the right represent mite species.

Previous records in Brazil. Rio Grande do Sul and São Paulo (Demite et al. 2024).

Amblyseius senecinis n. sp. Castro & Ferla

(Figures 3 and 4)

Diagnosis

Dorsal shield smooth, with slight constriction at level of *R1*; with seven pairs of solenostomes and 12 pairs of poroids, all dorsal setae minute, except *j1*, *j3*, *s4*, *Z4*, and *Z5* which are long. Setae *Z4* and *Z5* are slightly serrated. Setae *r3* and *R1* are inserted outside shield. Peritreme extending to level of *j1*. Sternal shield slightly sclerotized, with light reticulations in central region, and with three pairs of setae. Ventrianal shield smooth, pentagonal in shape, with pair of large crescentic solenostomes *gv3* posteromesad *JV2*. Setae *JV5* smooth. With two pairs of metapodal plates. Spermatheca with bell-shaped calyx and inconspicuous atrium. Fixed digit of chelicera with nine teeth and pilus dentilis in middle of chelae, movable digit with three teeth. All legs with macrosetae, *SgelV, StilV, StIV* apically swollen.

Female (n = 4)

Description

Dorsum. Idiosomal setal pattern 10A:9B/JV-3/ZV (r3 and R1 off shield). Dorsal shield smooth, with muscle marks; with slight

constriction at *R1* level; 366 (332–408) long and 277 (238–329) wide at *s4* level. With seven pairs of solenostomes (*gd1*, *gd2*, *gd4*, *gd5*, *gd6*, *gd8*, *gd9*) and 12 pairs of poroids (*id1*, *id2*, *id4*, *id6*, *id11*, *idl3*, *idm1*, *idm2*, *idm3*, *idm5*, *idm6*, *is1*). Most dorsal setae minute and smooth, except for *s4*, *Z4*, and *Z5*, markedly longer. Setae *Z4* and *Z5* slightly serrate. Measurements of dorsal setae: *j1* 22 (20–23), *j3* 30 (18–29), *j4* 10 (6–10), *j5* 7 (7–8), *j6* 9 (8–10), *J2* 13 (8–14), *J5* 8 (7–8), *z2* 9 (7–13), *z4* 10 (9–10), *z5* 9 (7–10), *Z1* 13 (12–13) *Z4* 58 (51–62), *Z5* 165 (157–174), *s4* 56 (54–58), *S2* 13 (11–13), *S4* 12 (10–13) *S5* 11 (9–13), *r3* 11 (9–12), *R1* 12 (11–13).

Venter. Ventral setal pattern 14: JV-3: ZV. Sternal shield 64 (61-66) long and, 80 (77-81) wide; sternal shield slightly sclerotized with some reticulations in central region and anterolateral striae, posterior margin medially pointed; with three pairs of setae (st1 - st3) and two pairs of poroids (ivl, iv2); st4 and iv3 tylochorous; distance between st1 - st3 59 (57-61), st2 - st2 71 (70-73). Genital shield smooth, 103 (96-102) long, and 93 (90-97) wide, distance between st5 - st5 81 (76-85). Ventrianal shield smooth, pentagonal shape, with lateral margin slightly concave posterior to ZV2 level; 108 (104-114) long, 93 (88-99) wide at ZV2 level, and 84 (81–89) at anus level; with three pairs of preanal setae (JV1, JV2, and ZV2); one pair of para-anal seta (Pa) and one post-anal seta (Pst); with a pair of large crescentic preanal pores (gv3) posteromesad JV2, distance between gv3 gv3 27 (25-26). Four pairs of opisthogastric setae on an unsclerotized cuticle (JV4, JV5, ZV1, ZV3). Seta JV5 59 (54-63) long. All



Figure 3. Amblyseius senecinis n. sp. (female). (a) Dorsal view of idiosoma, (b) Ventral view of idiossoma, (c) Chelicera, (d) Spermatheca, (e) Genu, tibia, and basitarsus of leg IV.

ventral setae smooth. One slender metapodal plate and one large.

Peritreme. Peritreme extending to *j1* level.

Chelicera. Fixed digit 28 (27–28) long, with nine teeth and pilus dentilis in middle of chelae; movable digit 29 (28–30) long, with three teeth.

Spermatheca. Calyx bell-shaped with inconspicuous atrium, 9 (8–10) long.

Legs. Length of legs: leg I 374 (352–395), leg II 312 (301–328), leg III 320 (308–339), leg IV 403 (382–421); with macrosetae on all legs: *Sge* I 22 (19–26), *Sge* II 22 (18–29), *Sge* III 35 (31–39), *Sti* III 34 (30–37), *Sge* IV 61 (48–75), *Sti* IV 45 (42–48), *St* IV 41 (36–45). Macrosetae *SgelV*, *StiIV*, *StIV* apically swollen. Chaetotaxy of legs as follows: Leg I: coxa 0 0/1 0/1 0, trochanter 1 0/1 0/2 1, femur 2 3/1 2/2 2, genu 2 2/1 2/1 2,



Figure 4. Amblyseius senecinis **n. sp**. (female). (a) and (b) - view of spermatheca (minor duct indicated by red arrow), (c) and (d) View of sternal shield with light reticulation in the central region, (e) View of genital and ventrianal shields.

tibia 2 2/1 2/1 2. Leg II: coxa 0 0/1 0/1 0, trochanter 1 0/1 0/2 1, femur 2 3/1 2/1 1, genu 2 2/0 2/0 1, tibia 1 1/1 2/1 1. Leg III: coxa 0 0/1 0/1 0, trochanter 1 1/1 0/2 0, femur 1 2/1 1/0 1, genu 1 2/1 2/0 1, tibia 1 1/1 2/1 1. Leg IV: coxa 0 0/1 0/0 0, trochanter 1 1/1 0/2 0, femur 1 2/1 1/0 1, genu 1 2/1 2/0 1, tibia 1 1/1 2/0 1.

Remarks. Amblyseius senecinis **n**. **sp**. belongs to obtusus species group and andersoni subgroup by dish-, cup-, bell-, or V-shaped calyx of spermatheca with length/width ratio at the midpoint of the calyx < 3:1 (Chant and McMurtry, 2004). This species was compared with the 120 species in the subgroup. Based on the combination of morphological characters, elongated dorsal setae *j1*, *j3*, *s4*, *Z4*, *Z5*, smooth genital and ventrianal shields, enlarged crescentic preanal pores *gv3*, preanal setae *JV1*, *JV2*, *ZV2* slightly migrated to the anterior margin on ventrianal shield, the new species morphologically similar to *A. bellatulus* Tseng, 1983, *A. biotafapesp* Demite et al. 2011, *A. impeltatus* Denmark and Muma, 1973, *A.*

paulofariensis Demite et al. 2007, and *A. sylvestris* Denmark and Muma, 1989. Comparative differences between species are presented in Table 3 (Denmark and Muma, 1989; Demite et al. 2007, 2011; Liao et al. 2017; Cavalcante et al. 2021).

Type material. One female holotype and three paratype females collected at Encruzilhada do Sul (30° 41 '45.94"S, 052° 43' 54.02"W), Rio Grande do Sul, Brazil, 01/XII/2021, on *S. brasiliensis* and *S. bonariensis*. The specimens were collected by the senior author of this study.

Type specimens will be deposited in the Department of Entomology and Acarology, Escola Superior de Agricultura Luiz de Queiroz (ESALQ), University of São Paulo, Piracicaba – SP, Brazil.

Etymology. The new species is named *senecinis* due to the host plant genus, from which the type specimens were collected.

Table 3. Differences in diagnostic characters between *amblyseius senecinis* **n**, **sp**.; *A. bellatulus* Tseng; *A. biotafapesp* demite, lofego & Feres; *A. impeltatus* Denmark & Muma; *A. paulofariensis* Demite; lofego & feres and *A. sylvestris* Denmark & muma (species with asterisks are redescribed by *Liao et al. 2017; **Cavalcante et al. 2021).

Characteristics Amblyseus senecinis n. sp. A bellatulus* A biotafapesp A impeltatus** A pauloariensis A sylvestris DSL 366 (332-408) 353-449 315-350 380-395 296-326 380 DSW 277 (238-329) 192-250 227-270 194-204 282 j1 32 (20-23) 23-32 19-24 19-20 17-20 j3 30 (18-29) 34-46 33-37 122-23 30-36 42 j4 10 (6-10) 5-13 6-7 8-10 5-7 5 j6 9 (8-10) 4-8 6-7 9-12 6-7 6 j2 13 (8-14) 4-9 7-8 7-9 6-9 6 j2 9 (7-13) 8-11 12-15 13-16 9-13 6 j4 10 (9-10) 4-8 5-6 10-14 5-7 5 j1 12-13 7-10 8-10 12-14 8-10 9 j4 10 (9-10		1 5	,			,	
DSL 366 (332-408) 333-449 315-350 380-395 296-36 380 DSW 277 (238-329) 192-250 207-225 237-270 194-204 282 J 30 (18-29) 34-46 33-37 22-23 30-36 420 J 10 (6-10) 5-13 6-7 8-10 5-7 5 J/6 9 (8-10) 4-8 6-7 9-12 6-7 6 J2 13 (8-14) 4-9 7-9 14-15 8-10 6 J2 9 (7-13) 8-11 12-15 13-16 9-13 6 Z4 10 (9-10) 8-13 8-9 10-12 7-10 6 Z5 9 (7-13) 8-11 12-14 8-10 9 7 9 7 Z4 56 (5-62) 47-57 54-60 34-41 48-56 141 Z5 16 (5-15-21/4) 17-15 10-12 7-16 10-12 7-16 10 12-14 10-13 </td <td>Characteristics</td> <td>Amblyseius senecinis n. sp.</td> <td>A. bellatulus*</td> <td>A. biotafapesp</td> <td>A. impeltatus**</td> <td>A. paulofariensis</td> <td>A. sylvestris</td>	Characteristics	Amblyseius senecinis n. sp.	A. bellatulus*	A. biotafapesp	A. impeltatus**	A. paulofariensis	A. sylvestris
DSW 277 (238-329) 192-250 202-225 237-270 194-204 282 j 22 (20-23) 23-32 19-24 19-20 17-20 - j3 30 (18-29) 34-46 33-37 22-23 30-36 42 j4 10 (6-10) 5-13 6-7 8-10 5-7 5 j6 9 (8-10) 4-8 6-7 9-12 6-7 6 j2 9 (7-8) 4-9 7-78 7-9 6-9 6 j2 9 (7-13) 8-11 12-15 13-16 9-13 6 j4 10 (9-10) 8-8 5-6 10-12 7-10 6 j2 9 (7-10) 4-8 5-6 10-14 5-7 5 j4 13 (12-13) 7-10 8-10 12-14 8-10 9 j4 56 (54-58) 43-61 42-49 39-43 41-52 120 j5 11 (9-13) 6-1 42-49 39-43	DSL	366 (332–408)	353-449	315-350	380-395	296-326	380
	DSW	277 (238-329)	192-250	202–225	237-270	194-204	282
j3 30 (18-29) 34-46 33-37 22-23 30-36 42 j4 10 (6-10) 5-13 6-7 8-10 5-7 5 j5 7 (7-8) 4-7 5-6 7-10 5-6 5 j6 9 (8-10) 4-8 6-7 9-12 6-7 6 j2 13 (8-14) 4-9 7-9 14-15 8-10 6 j5 8 (7-8) 4-9 7-8 7-9 6-9 6 j2 9 (7-13) 8-11 12-15 13-16 9-13 6 j4 10 (9-10) 8-13 8-9 10-12 7-10 6 j4 13 (12-13) 7-10 8-10 12-14 8-10 9 j4 56 (54-58) 43-61 42-49 39-43 41-52 1200 j5 13 (11-13) 9-13 9-11 13-15 9-12 9 j5 11 (9-13) 6-9 7-9 11-14 11-14 8 j5 11 (9-13) 6-9 7-9 11-14 11-1	j1	22 (20–23)	23–32	19–24	19–20	17-20	-
j4 10 (6-10) 5-13 6-7 8-10 5-7 5 j5 7 (7-8) 4-7 5-6 7-10 5-6 5 j6 9 (8-10) 4-8 6-7 9-12 6-7 6 J2 13 (8-14) 4-9 7-9 14-15 8-10 6 J2 9 (7-13) 8-11 12-15 13-16 9-13 6 z4 10 (9-10) 8-13 8-9 10-12 7-10 6 Z5 9 (7-10) 4-8 5-6 10-14 8-10 9 Z4 38 (51-62) 47-57 54-60 34-41 48-56 141 Z5 165 (157-174) 117-158 104-140 12-14 8-10 9 S4 26 (54-58) 43-61 42-49 39-43 41-52 120 S4 11 (9-13) 5-11 8-12 12-14 11-13 10 14 8 S4 11 (9-13) 5-11 <	j3	30 (18–29)	34–46	33–37	22–23	30-36	42
j5 7 (7-8) 4-7 5-6 7-10 5-6 5 j6 9 (8-10) 4-8 6-7 9-12 6-7 6 j2 13 (8-14) 4-9 7-9 14-15 8-10 6 j5 8 (7-8) 4-9 7-8 7-9 6-9 6 z2 9 (7-13) 8-11 12-15 13-16 9-13 6 z4 10 (9-10) 8-13 8-9 10-12 7-10 6 z5 9 (7-10) 4-8 5-6 10-14 5-7 5 z1 13 (12-13) 7-10 8-10 12-14 8-10 9 z4 56 (51-62) 47-57 54-60 34-41 48-56 141 z5 165 (157-174) 117-158 104-140 120-140 75-87 219 z4 56 (54-58) 43-61 42-49 39-43 41-52 120 z5 11 (9-13) 6-9 7-9 11-14 11-13 10 12 z5 11 (9-13) 6-9 7-9	j4	10 (6–10)	5–13	6–7	8–10	5–7	5
f6 9 (8-10) 4-8 6-7 9-12 6-7 6 J2 13 (8-14) 4-9 7-9 14-15 8-10 6 J5 8 (7-8) 4-9 7-8 7-9 6-9 6 z2 9 (7-13) 8-11 12-15 13-16 9-13 6 z4 10 (9-10) 8-13 8-9 10-12 7-10 6 z5 9 (7-10) 4-8 5-6 10-14 5-7 5 Z1 13 (12-13) 7-10 8-10 12-14 8-10 9 Z4 56 (54-58) 43-61 42-49 39-43 41-52 120 S2 13 (11-13) 9-13 9-11 13-15 9-12 9 S4 56 (54-58) 43-61 42-49 39-43 41-52 120 S2 13 (11-13) 5-11 8-12 12-14 11-13 10 S5 11 (9-12) 17-21 10-13 11-14	j5	7 (7 –8)	4–7	5–6	7–10	5–6	5
J2 13 (8-14) 4-9 7-9 14-15 8-10 6 J5 8 (7-8) 4-9 7-8 7-9 6-9 6 Z2 9 (7-13) 8-11 12-15 13-16 9-13 6 Z4 10 (9-10) 8-13 8-9 10-12 7-10 6 Z5 9 (7-10) 4-8 5-6 10-14 5-7 5 Z4 13 (12-13) 7-10 8-10 12-14 8-10 9 Z4 58 (51-62) 47-57 54-60 34-41 48-56 141 Z5 165 (157-174) 117-158 104-140 120-140 75-87 120 S4 56 (54-58) 43-61 42-49 39-43 41-52 120 S4 11 (9-13) 5-11 8-13 9-12 12-14 11-13 10 S5 11 (9-13) 6-9 7-9 11-14 11-14 8 1 - S6 11 (9-12) 17-21 10-13 11-13 10-12 - - Sgell<	j6	9 (8–10)	4–8	6–7	9–12	6–7	6
J5 8 (7-8) 4-9 7-8 7-9 6-9 6 22 9 (7-13) 8-11 12-15 13-16 9-13 6 24 10 (9-10) 8-13 8-9 10-12 7-10 6 25 9 (7-10) 4-8 5-6 10-14 5-7 5 21 13 (12-13) 7-10 8-10 12-14 8-10 9 24 58 (51-62) 47-57 54-60 34-41 48-56 141 25 165 (157-174) 117-158 104-140 120-140 75-87 219 s4 56 (54-58) 43-61 42-49 39-43 41-52 120 52 13 (11-13) 9-13 9-11 13-15 9-12 9 54 12 (11-13) 6-9 7-9 11-14 11-14 8 55 11 (9-12) 17-21 10-13 11-13 10-12 - 8/8/ 21 (19-20) - 29-32 <	J2	13 (8–14)	4–9	7–9	14–15	8–10	6
22 9 (7-13) 8-11 12-15 13-16 9-13 6 z4 10 (9-10) 8-13 8-9 10-12 7-10 6 z5 9 (7-10) 4-8 5-6 10-14 5-7 5 Z1 13 (12-13) 7-10 8-10 12-14 8-10 9 Z4 58 (51-62) 47-57 54-60 34-41 48-56 141 Z5 165 (157-174) 117-158 104-140 120-140 75-87 219 s4 56 (54-58) 43-61 42-49 39-43 41-52 120 S2 13 (11-13) 9-13 9-11 13-15 9-12 9 S4 12 (11-13) 5-11 8-10 10-13 10 10 S5 11 (9-12) 17-21 10-13 11-14 11-14 8 Sgel 22 (19-26) - 29-32 31-33 29-33 - Sgel/ 23 (30-37) - 25-31	J5	8 (7–8)	4–9	7–8	7–9	6–9	6
z4 10 (9-10) 8-13 8-9 10-12 7-10 6 z5 9 (7-10) 4-8 5-6 10-14 5-7 5 Z1 13 (12-13) 7-10 8-10 12-14 8-10 9 Z4 58 (51-62) 47-57 54-60 34-41 48-56 141 Z5 165 (157-174) 117-158 104-140 120-140 75-87 219 s4 56 (54-58) 43-61 42-49 39-43 41-52 9 S2 13 (11-13) 9-13 9-11 13-15 9-12 9 S4 12 (11-13) 5-11 8-12 12-14 11-13 10 S5 11 (9-12) 17-21 10-13 11-13 10-12 - R1 22 (11-26) - 29-32 31-33 29-33 - Segel 22 (19-26) - 29-34 - - Segel/ 35 (31-39) 27-37 34-40 42-45 </td <td>z2</td> <td>9 (7–13)</td> <td>8–11</td> <td>12–15</td> <td>13–16</td> <td>9–13</td> <td>6</td>	z2	9 (7–13)	8–11	12–15	13–16	9–13	6
z5 9 (7-10) 4-8 5-6 10-14 5-7 5 Z1 13 (12-13) 7-10 8-10 12-14 8-10 9 Z4 58 (51-62) 47-57 54-60 34-41 48-56 141 Z5 165 (157-174) 117-158 104-140 120-140 75-87 219 s4 56 (54-58) 43-61 42-49 39-43 41-52 120 S2 13 (11-13) 9-13 9-11 13-15 9-12 9 S4 12 (11-13) 5-11 8-12 12-14 11-13 10 S5 11 (9-12) 17-21 10-13 11-14 11-14 8 Sgel 22 (19-26) - 29-32 31-33 29-33 - Sgell 34 (30-37) - 25-31 27-31 22-27 - Sgell/ 34 (30-37) - 25-31 27-31 22-27 - Sgell/V 61 (48-75) 40-59	z4	10 (9–10)	8–13	8–9	10-12	7–10	6
21 13 (12-13) 7-10 8-10 12-14 8-10 9 24 58 (51-62) 47-57 54-60 34-41 48-56 141 25 165 (157-174) 117-158 104-140 120-140 75.87 219 54 56 (54-58) 43-61 42-49 39-43 41-52 120 52 13 (11-13) 9-13 9-11 13-15 9-12 9 54 12 (11-13) 5-11 8-12 12-14 11-13 10 55 11 (9-12) 17-21 10-13 11-13 10-12 - 73 11 (9-12) 17-21 10-13 10-12 - - 56 22 (19-26) - 29-32 31-33 29-33 - 5gell 22 (18-29) 26-33 30-32 32-35 26-31 - 5gell/ 35 (31-39) 27-37 34-40 42-45 29-34 - 5till/ 34 (30-37) - 25-31 27-31 22-27 - 5gell/ 35 (31-39)	z5	9 (7–10)	4–8	5–6	10-14	5–7	5
Z4 58 (51-62) 47-57 54-60 34-41 48-56 141 Z5 165 (157-174) 117-158 104-140 120-140 75-87 219 s4 56 (54-58) 43-61 42-49 39-43 41-52 120 52 13 (11-13) 9-13 9-11 13-15 9-12 9 54 12 (11-13) 5-11 8-12 12-14 11-13 10 55 11 (9-13) 6-9 7-9 11-14 11-14 8 r3 11 (9-13) 8-13 8-10 12-14 8-10 - 5gel 22 (19-26) - 29-32 31-33 29-33 - 5gell 35 (31-39) 27-37 34-40 42-45 29-34 - 5gell/ 34 (30-37) - 25-31 27-37 22-27 - 5gell/ 61 (48-75) 40-59 59-70 68-71 51-55 126 5tii/V 45 (42-48) 40-5	Z1	13 (12–13)	7–10	8–10	12–14	8–10	9
Z5 165 (157-174) 117-158 104-140 120-140 75-87 219 s4 56 (54-58) 43-61 42-49 39-43 41-52 120 52 13 (11-13) 9-13 9-11 13-15 9-12 9 54 12 (11-13) 5-11 8-12 12-14 11-13 10 55 11 (9-12) 17-21 10-13 11-13 10-12 - 73 12 (11-13) 8-13 8-10 12-14 8-10 - 5gel 22 (19-26) - 29-33 29-33 - 5gell 35 (31-39) 27-37 34-40 42-45 29-34 - 5gell/ 35 (31-39) 27-37 34-40 42-45 29-34 - 5gell/ 34 (30-37) - 25-31 27-31 22-27 - 5gell/ 34 (30-37) - 25-31 27-31 32-35 126 5til/V 41 (36-45) 66-84 6	Z4	58 (51–62)	47–57	54–60	34-41	48-56	141
s4 56 (54–58) 43–61 42–49 39–43 41–52 120 52 13 (11–13) 9–13 9–11 13–15 9–12 9 54 12 (11–13) 5–11 8–12 12–14 11–13 10 55 11 (9–13) 6–9 7–9 11–14 11–14 8 r3 11 (9–12) 17–21 10–13 11–13 10–12 – 8 12 (11–13) 8–13 8–10 12–14 8–10 – 5gel 22 (19–26) – 29–32 31–33 29–33 – 5gell 32 (18–29) 26–33 30–32 32–35 26–31 – Sgell 35 (31–39) 27–37 34–40 42–45 29–34 – Sgell 34 (30–37) – 25–31 27–31 22–27 – Sgell v 61 (48–75) 40–59 59–70 68–71 51–55 126 Stil/v 45 (62–48 40–51	Z5	165 (157–174)	117–158	104–140	120-140	75–87	219
S2 13 (11-13) 9-13 9-11 13-15 9-12 9 S4 12 (11-13) 5-11 8-12 12-14 11-13 10 S5 11 (9-13) 6-9 7-9 11-14 11-14 8 r3 11 (9-12) 17-21 10-13 11-13 10-12 - Sgel 22 (19-26) - 29-32 31-33 29-33 - Sgell 22 (18-29) 26-33 30-32 32-35 26-31 - Sgell 35 (31-39) 27-37 34-40 42-45 29-34 - Still/ 34 (30-37) - 25-31 27-31 22-27 - SgelV 61 (48-75) 40-59 59-70 68-71 51-55 126 Still/ 45 (42-48) 40-51 45-52 51-54 38-43 81 StiV 41 (36-45) 66-84 60-69 54-58 48-56 53 Shape of seta Z4 & Z5 Lightly serrated Lightly serrated Serrated Serrated - Length of calyx <td>s4</td> <td>56 (54–58)</td> <td>43–61</td> <td>42–49</td> <td>39–43</td> <td>41-52</td> <td>120</td>	s4	56 (54–58)	43–61	42–49	39–43	41-52	120
S4 12 (11-13) 5-11 8-12 12-14 11-13 10 S5 11 (9-13) 6-9 7-9 11-14 11-14 8 r3 11 (9-12) 17-21 10-13 11-13 10-12 - Sgel 22 (19-26) - 29-32 31-33 29-33 - Sgel/ 22 (18-29) 26-33 30-32 32-35 26-31 - Sgel/ 35 (31-39) 27-37 34-40 42-45 29-34 - Still/ 34 (30-37) - 25-31 27-31 22-27 - SgelV 61 (48-75) 40-59 59-70 68-71 51-55 126 Still/ 45 (42-48) 40-51 45-52 51-54 38-43 81 Stil/V 41 (36-45) 66-84 60-69 54-58 48-56 53 Shape of seta Z4 & Z5 Lightly serrated Lightly serrated Serrated Serrated - Length of calyx 9 (8-10) - 11-14 7-9 7-9 8 Shape of at	S2	13 (11–13)	9–13	9–11	13–15	9–12	9
55 11 (9-13) 6-9 7-9 11-14 11-14 8 r3 11 (9-12) 17-21 10-13 11-13 10-12 - R1 12 (11-13) 8-13 8-10 12-14 8-10 - Sgel 22 (19-26) - 29-32 31-33 29-33 - Sgell 35 (31-39) 27-37 34-40 42-45 29-34 - Sgell 35 (31-39) 27-37 34-40 42-45 29-34 - SgelV 61 (48-75) 40-59 59-70 68-71 51-55 126 StillV 45 (42-48) 40-51 45-52 51-54 38-43 81 StilV 41 (36-45) 66-84 60-69 54-58 48-56 53 Shape of seta Z4 & Z5 Lightly serrated Lightly serrated Serrated - 41 Shape of calyx 9 (8-10) - 11-14 7-9 7-9 8 Shape of calyx bell-shaped funnel-shaped bell-shaped bell-shaped tubular pocular	S4	12 (11–13)	5–11	8–12	12–14	11–13	10
r3 11 (9-12) 17-21 10-13 11-13 10-12 - R1 12 (11-13) 8-13 8-10 12-14 8-10 - Sgel 22 (19-26) - 29-32 31-33 29-33 - Sgell 22 (18-29) 26-33 30-32 32-35 26-31 - Sgell 35 (31-39) 27-37 34-40 42-45 29-34 - SgelV 61 (48-75) 40-59 59-70 68-71 51-55 126 Still/ 45 (42-48) 40-51 45-52 51-54 38-43 81 Stil/ 41 (36-45) 66-84 60-69 54-58 48-56 53 Shape of seta Z4 & Z5 Lightly serrated Lightly serrated Serrated Serrated Serrated - Shape of calyx 9 (8-10) - 11-14 7-9 7-9 8 5 Shape of atrium atrium inconspicuous atrium with neck atrium porly developed. atrium indistinct - atrium undifferentiated Shape of atrium 9/3 1	S5	11 (9–13)	6–9	7–9	11–14	11–14	8
R1 12 (11-13) 8-13 8-10 12-14 8-10 - Sgel 22 (19-26) - 29-32 31-33 29-33 - Sgell 22 (18-29) 26-33 30-32 32-35 26-31 - Sgell 35 (31-39) 27-37 34-40 42-45 29-34 - Still 34 (30-37) - 25-31 27-31 22-27 - SgelV 61 (48-75) 40-59 59-70 68-71 51-55 126 StillV 45 (42-48) 40-51 45-52 51-54 38-43 81 StilV 41 (36-45) 66-84 60-69 54-58 48-56 53 Shape of seta Z4 & Z5 Lightly serrated Lightly serrated Serrated Serrated - Shape of calyx bell-shaped funel-shaped bell-shaped bell-shaped bell-shaped tubular pocular Shape of atrium atrium inconspicuous atrium with neck atrium porly developed. atrium indistinct - atrium undifferentiated No. of teeth: FD/MD	r3	11 (9–12)	17–21	10–13	11–13	10-12	-
Sgel 22 (19–26) - 29–32 31–33 29–33 - Sgell 22 (18–29) 26–33 30–32 32–35 26–31 - Sgell 35 (31–39) 27–37 34–40 42–45 29–34 - Still 34 (30–37) - 25–31 27–31 22–27 - SgelV 61 (48–75) 40–59 59–70 68–71 51–55 126 StillV 45 (42–48) 40–51 45–52 51–54 38–43 81 StIV 41 (36–45) 66–84 60–69 54–58 48–56 53 Shape of seta Z4 & Z5 Lightly serrated Lightly serrated Serrated Serrated - Shape of calyx bell-shaped funel-shaped bell-shaped bell-shaped tubular pocular Shape of atrium atrium inconspicuous atrium with neck atrium poorly developed. atrium indistinct - atrium undifferentiated No. of teeth: FD/MD 9/3 10/3 9–11/	R1	12 (11–13)	8–13	8–10	12–14	8–10	-
Sgell 22 (18–29) 26–33 30–32 32–35 26–31 – Sgelll 35 (31–39) 27–37 34–40 42–45 29–34 – Stilll 34 (30–37) – 25–31 27–31 22–27 – SgelV 61 (48–75) 40–59 59–70 68–71 51–55 126 StilV 45 (42–48) 40–51 45–52 51–54 38–43 81 StIV 41 (36–45) 66–84 60–69 54–58 48–56 53 Shape of seta Z4 & Z5 Lightly serrated Lightly serrated Serrated Serrated – Shape of calyx 9 (8–10) – 11–14 7–9 7–9 8 Shape of atrium atrium inconspicuous atrium with neck atrium poorly developed. atrium indistinct – atrium undifferentiated No. of teeth: FD/MD 9/3 10/3 9–11/3 8–10/3 8–10/3 11/3 Sternal shield soft central reticulation Smooth Smooth	Sgel	22 (19–26)	-	29–32	31–33	29–33	-
Sgelll 35 (31-39) 27-37 34-40 42-45 29-34 - Stilll 34 (30-37) - 25-31 27-31 22-27 - SgelV 61 (48-75) 40-59 59-70 68-71 51-55 126 StillV 45 (42-48) 40-51 45-52 51-54 38-43 81 StIV 41 (36-45) 66-84 60-69 54-58 48-56 53 Shape of seta Z4 & Z5 Lightly serrated Lightly serrated Serrated Serrated Serrated - Shape of calyx 9 (8-10) - 11-14 7-9 7-9 8 Shape of calyx bell-shaped funel-shaped bell-shaped tubular pocular Shape of calyx bell-shaped funel-shaped bell-shaped atrium undifferentiated No. of teeth: FD/MD 9/3 10/3 9-11/3 8-10/3 8-10/3 11/3 Sternal shield soft central reticulation Smooth Smooth Smooth Smoo	Sgell	22 (18–29)	26–33	30–32	32–35	26-31	-
Still 34 (30-37)- $25-31$ $27-31$ $22-27$ -SgelV 61 (48-75) $40-59$ $59-70$ $68-71$ $51-55$ 126 StilV 45 (42-48) $40-51$ $45-52$ $51-54$ $38-43$ 81 StilV 41 (36-45) $66-84$ $60-69$ $54-58$ $48-56$ 53 Shape of seta Z4 & Z5Lightly serratedLightly serratedSerratedSerratedSerratedLength of calyx 9 (8-10)- $11-14$ $7-9$ $7-9$ 8 Shape of seta irium inconspicuousatrium with neckatrium poorly developed.atrium indistinct-atrium undifferentiatedNo. of teeth: FD/MD $9/3$ $10/3$ $9-11/3$ $8-10/3$ $8-10/3$ $11/3$ Sternal shieldsoft central reticulationSmoothSmoothSmoothSmoothSmooth	Sgelll	35 (31–39)	27–37	34–40	42–45	29–34	-
SgelV61 (48–75)40–5959–70 $68–71$ $51-55$ 126 StilV45 (42–48)40–5145–52 $51-54$ $38-43$ 81 StlV41 (36–45) $66-84$ $60-69$ $54-58$ $48-56$ 53 Shape of seta Z4 & Z5Lightly serratedLightly serratedSerratedSerratedSerratedLength of calyx9 (8–10)- $11-14$ $7-9$ $7-9$ 8 Shape of calyxbell-shapedfunnel-shapedbell-shapedbell-shapedtubularpocularShape of atriumatrium inconspicuousatrium with neckatrium porly developed.atrium indistinct-atrium undifferentiatedNo. of teeth: FD/MD9/3 $10/3$ $9-11/3$ $8-10/3$ $8-10/3$ $11/3$ Sternal shieldsoft central reticulationSmoothSmoothSmoothSmoothSmoothVentrianal shieldSmoothSmoothSmoothSmoothSmoothSmooth	Stilll	34 (30–37)	-	25–31	27–31	22–27	-
Still/45 (42-48)40-5145-5251-5438-4381Stlv41 (36-45)66-8460-6954-5848-5653Shape of seta Z4 & Z5Lightly serratedLightly serratedSerratedSerratedSerratedLength of calyx9 (8-10)-11-147-97-98Shape of calyxbell-shapedfunnel-shapedbell-shapedbell-shapedtubularpocularShape of atriumatrium inconspicuousatrium with neckatrium poorly developed.atrium indistinct-atrium undifferentiatedNo. of teeth: FD/MD9/310/39-11/38-10/38-10/311/3Sternal shieldsoft central reticulationSmoothSmoothSmoothSmoothSmoothVentrianal shieldSmoothSmoothSmoothSmoothSmoothSmoothSmooth	SgelV	61 (48–75)	40–59	59–70	68–71	51–55	126
St/V41 (36-45)66-8460-6954-5848-5653Shape of seta Z4 & Z5Lightly serratedLightly serratedSerratedSerratedSerrated-Length of calyx9 (8-10)-11-147-97-98Shape of calyxbell-shapedfunnel-shapedbell-shapedbell-shapedtubularpocularShape of atriumatrium inconspicuousatrium with neckatrium poorly developed.atrium indistinct-atrium undifferentiatedNo. of teeth: FD/MD9/310/39-11/38-10/38-10/311/3Sternal shieldsoft central reticulationSmoothSmoothSmoothSmoothSmoothVentrianal shieldSmoothSmoothSmoothSmoothSmoothSmooth	StilV	45 (42–48)	40–51	45–52	51–54	38–43	81
Shape of seta Z4 & Z5Lightly serratedLightly serratedSerratedSerratedSerrated-Length of calyx9 (8–10)-11–147–97–98Shape of calyxbell-shapedfunnel-shapedbell-shapedbell-shapedtubularpocularShape of atriumatrium inconspicuousatrium with neckatrium poorly developed.atrium indistinct-atrium undifferentiatedNo. of teeth: FD/MD9/310/39–11/38–10/38–10/311/3Sternal shieldsoft central reticulationSmoothSmoothSmoothSmoothSmoothVentrianal shieldSmoothSmoothSmoothSmoothSmoothSmoothSmooth	StIV	41 (36–45)	66–84	60–69	54–58	48–56	53
Length of calyx9 (8–10)–11–147–97–98Shape of calyxbell-shapedfunnel-shapedbell-shapedbell-shapedtubularpocularShape of atriumatrium inconspicuousatrium with neckatrium poorly developed.atrium indistinct–atrium undifferentiatedNo. of teeth: FD/MD9/310/39–11/38–10/38–10/311/3Sternal shieldsoft central reticulationSmoothSmoothSmoothSmoothSmoothVentrianal shieldSmoothSmoothSmoothSmoothSmoothSmoothSmooth	Shape of seta Z4 & Z5	Lightly serrated	Lightly serrated	Serrated	Serrated	Serrated	-
Shape of calyxbell-shapedfunnel-shapedbell-shapedbell-shapedtubularpocularShape of atriumatrium inconspicuousatrium with neckatrium poorly developed.atrium indistinct-atrium undifferentiatedNo. of teeth: FD/MD9/310/39–11/38–10/38–10/311/3Sternal shieldsoft central reticulationSmoothSmoothSmoothSmoothSmoothVentrianal shieldSmoothSmoothSmoothSmoothSmoothSmooth	Length of calyx	9 (8–10)	-	11–14	7–9	7–9	8
Shape of atriumatrium inconspicuousatrium with neckatrium poorly developed.atrium indistinct-atrium undifferentiatedNo. of teeth: FD/MD9/310/39–11/38–10/38–10/311/3Sternal shieldsoft central reticulationSmoothSmoothSmoothSmoothSmoothVentrianal shieldSmoothSmoothSmoothSmoothSmoothSmooth	Shape of calyx	bell-shaped	funnel-shaped	bell-shaped	bell-shaped	tubular	pocular
No. of teeth: FD/MD9/310/39–11/38–10/38–10/311/3Sternal shieldsoft central reticulationSmoothSmoothSmoothSmoothSmoothVentrianal shieldSmoothSmoothSmoothSmoothSmoothSmoothSmooth	Shape of atrium	atrium inconspicuous	atrium with neck	atrium poorly developed.	atrium indistinct	-	atrium undifferentiated
Sternal shieldsoft central reticulationSmoothSmoothSmoothSmoothSmoothVentrianal shieldSmoothSmoothSmoothSmoothSmoothSmooth	No. of teeth: FD/MD	9/3	10/3	9–11/3	8-10/3	8-10/3	11/3
Ventrianal shield Smooth Smooth Smooth Smooth Smooth Smooth Smooth	Sternal shield	soft central reticulation	Smooth	Smooth	Smooth	Smooth	Smooth
	Ventrianal shield	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth

Amblyseius vitis Ferla and Silvaq, 2009

Amblyseius vitis - Ferla and Silva, 2009: 509.

Specimens examined – Dom Pedrito – P8: plant 8, XI–2021 (1 \bigcirc). Measurements of a single female collected: dorsal shield 452 long and 289 wide, *j*1 33, *j*3 30, *j*4 5, *j*5 5, *j*6 6, *J*2 6, *J*5 11, *z*2 6, *z*4 8, *z*5 5, *Z*1 7, *Z*4 265, *Z*5 461, *s*4 210, *S*2 9, *S*4 11, *S*5 11, *r*3 8, *R*1 8, *Sge* I 75, *Sge* II 50, *Sge* III 100, *Sti* III 74, *Sge* IV 240, *Sti* IV 181, *St* IV 141, *st*1–*st*3 81, *st*2–*st*2 90, *st5–st5* 98, ventrianal shield 140 long, 105 wide at *ZV2* level, and 112 wide at anus level; spermathecal calyx 19 long; fixed cheliceral 32 long, with eight teeth, movable digit 34 long, with three teeth.

Remarks. The measurements of the single female specimen examined fit those in the original description (Ferla and Silva 2009), except for the longer *Z4*, *Z5*, *s4*, *Sge IV*, *Sti IV*, and *St IV* setae (265, 461, 210, 240, 181, and 146, respectively). However, these setae have variations in length (Klock et al. 2011; Rocha et al. 2015; Ferragut and Navia 2017). This is the first record of this species Pampa biome.

Previous records in Brazil. Rio Grande do Sul (Demite et al. 2024).

Genus Arrenoseius Wainstein

Arrenoseius gaucho, Ferla et al. 2010

Arrenoseius gaucho - Ferla et al. 2010: 15.

Specimens examined – Dom Pedrito – P7: A. montevidensis, V–2022 ($2 \bigcirc \bigcirc$).

Two adult females measured: dorsal shield 314–320 long and 191–200 wide, *j1* 20–22, *j3* 10–12, *j4* 11–13, *j5* 10–12, *j6* 9–12, *J2* 10–12, *J5* 9, *z2* 11–13, *z4* 11–13, *z5* 8–9, *Z1* 12–13, *Z4* 52–69, *Z5* 63–64, *s4* 38–45, *S2* 23–25, *S4* 10–11, *S5* 11–12, *r3* 10–13, *R1* 11–12, *Sge* IV 32–

38, *Sti* IV 24–27, *St* IV 38–42, *st1–st3* 56–59, *st2–st2* 66–68, *st5–st5* 70, ventrianal shield 100–109 long, 97–98 wide at *ZV2* level, and 78–85 wide at anus level; spermathecal calyx 10 long; fixed cheliceral digit 30 long, with two teeth, movable digit 29 long, with one tooth.

Remarks. The measurements of the examined female specimens correspond to those in the original description (Ferla et al. 2010), excepting for the longer *Z5*. This species was already reported in this biome on *Elephantopus mollis* Kunth (Asteraceae) and *Eryngium horridum* Malme (Apiaceae) (Toldi et al. 2021).

Previous records in Brazil. Rio Grande do Sul (Demite et al. 2024).

Arrenoseius morgani (Chant, 1957)

Typhlodromus morgani - Chant, 1957: 294.

Specimens examined – Dom Pedrito – P7: A. montevidensis, V–2022 $(1 \circ)$.

Measurements of a single female collected: dorsal shield 317 long and 251 wide, *j*1 24, *j*3 33, *j*4 2, *j*5 2, *j*6 8, *J*2 2, *J*5 9, *z*2 2, *z*4 2, *z*5 4, *Z*1 6, *Z*4 102, *Z*5 110, *s*4 91, *S*2 2, *S*4 2, *S*5 3, *r*3 6, *R*1 4, *Sge* IV 45, *Sti* IV 29, *St* IV 51, *st*1–*st*3 55, *st*2–*st*2 66, *st*5–*st*5 82, ventrianal shield 97 long, 98 wide at *ZV*2 level, and 65 wide at anus level; spermathecal calyx 20 long; fixed and movable cheliceral digits not visible.

Remarks. The measurements of the single female specimen examined fit those in the redescriptions by Faraji (2006) and Moraes et al. (2013), except that seta Z5 is shorter. The species is being reported for the first time in the Pampa biome at Rio Grande do Sul.

Previous records in Brazil. Acre, Amazonas, Bahia, São Paulo (Demite et al. 2024).

Genus Euseius Wainstein

Euseius citrifolius Denmark and Muma, 1970

Euseius citrifolius - Denmark and Muma, 1970: 222.

Specimens examined – São Luiz Gonzaga – P6: Chromolaena pedunculosa (Hook. & Arn.) R.M. King & H. Rob, VI–2022 (2 \bigcirc).

Two adult females measured: dorsal shield 295–318 long and 211–219 wide, *j1* 25–26, *j3* 21–26, *j4* 11–13, *j5* 9–14, *j6* 13, *J2* 14–17, *J5* 5–7, *z2* 20–21, *z4* 24, *z5* 13, *Z1* 13, *Z4* 17, *Z5* 63, *s4* 39–40, *S2* 18–20, *S4* 18–21, *S5* 25–26, *r3* 19, *R1* 11–15, *Sge* IV 34–44, *Sti* IV 26–30, *St* IV 50–53, *st1–st3* 57–58, *st2–st2* 71–72, *st5–st5* 76–81, ventrianal shield 99 long, 53–57 wide at *ZV2* level, and 62–67 wide at anus level; spermathecal calyx 17–18 long; fixed cheliceral digit 24–26 long, with three teeth, movable digit 22–25 long, with one tooth.

Remarks. The measurements of the examined female specimens fit those in the description original (Denmark and Muma, 1970) and redescriptions by Moraes and McMurtry (1983), Moraes et al. (1991), Lofego et al. (2009) and Demite et al. (2017) as well.

Previous records in Brazil. Amazonas, Bahia, Ceará, Distrito Federal, Goiás, Maranhão, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Paraná, Paraíba, Pernambuco, Piauí, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Roraima, Santa Catarina, São Paulo, Tocantins (Demite et al. 2024).

Euseius concordis (Chant, 1959)

Typhlodromus (Amblyseius) concordis - Chant, 1959: 69.

Specimens examined – Capivari do Sul – P13: Chromolaena laevigata (Lam.) R.M. King & H. Rob., I–2022 (1 $^{\circ}$).

Measurements of a single female collected: dorsal shield 304 long and 273 wide, *j*1 29, *j*3 43, *j*4 9, *j*5 8, *j*6 11, *J*2 11, *J*5 5, *z*2 22, *z*4 38, *z*5 7, *Z*1 10, *Z*4 9, *Z*5 72, *s*4 55, *S*2 13, *S*4 19, *S*5 21, *r*3 13, *R*1 19, *Sge* IV 45, *Sti* IV 32, *St* IV 50, *st*1–*st*3 61, *st*2–*st*2 69, *st*5–*st*5 80, ventrianal shield 120 long, 53 wide at *ZV*2 level, and 74 wide at anus level; spermathecal calyx not visible; fixed cheliceral digit 27 long, with four tooth, movable digit 25 long, with one tooth.

Remarks. The measurements of the single female specimen examined fit those in the original description (Chant, 1959) and the redescriptions by Moraes and McMurtry (1983), Guanilo et al. (2008), Lopes et al. (2015) and Demite et al. (2017).

Previous records in Brazil. Acre, Amazonas, Bahia, Ceará, Espírito Santo, Goiás, Maranhão, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Paraná, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, Rio Grande do Sul, Roraima, Santa Catarina, São Paulo, Tocantins (Demite et al. 2024).

Euseius inouei (Ehara and Moraes, 1998)

Amblyseius inouei - Ehara and Moraes, 1998: 59.

Specimens examined – São Vicente do Sul – P1: *Erechtites hieraciifolius* (L.) Raf. ex DC., XI–2021 ($2 \bigcirc \bigcirc$); Dom Pedrito – P7: *Campuloclinium macrocephalum*, III–2022 ($1 \bigcirc$), *Stenocephalum megapotamicum* (Spreng.) Sch. Bipo., III–2021 ($1 \bigcirc$); Encruzilhada do Sul – P10: *B. dracunculifolia.*, V–2022 ($2 \bigcirc \bigcirc$).

Six adult females measured: dorsal shield 334 (304–356) long and 226 (200–240) wide, *j1* 29 (24–32), *j3* 27 (24–31), *j4* 14 (11–16), *j5* 14 (13–16), *j6* 17 (15–19), *J2* 19 (17–21), *J5* 8 (7–9), *z2* 19 (18–20), *z4* 21 (19–24), *z5* 16 (15–17), *Z1* 18 (16–20), *Z4* 23 (19–25), *Z5* 62 (60–66), *s4* 30 (26–34), *S2* 23 (21–25), *S4* 27 (23–31), *S5* 30 (26–36), *r3* 16 (14–18), *R1* 15 (13–17), *Sge* IV 41 (39–44), *Sti* IV 29 (25–33), *St* IV 49 (46–53), *st1–st3* 59 (57–61), *st2–st2* 70 (66–73), *st5–st5* 76 (72– 79), ventrianal shield 99 (82–109) long, 60 (55–63) wide at *ZV2* level, and 69 (61–74) wide at anus level, spermathecal calyx 19 (17–21) long; fixed cheliceral digit 26 (23–28) long, with four teeth, movable digit 23 (21–24) long, with one tooth.

Remarks. The measurements of the examined female specimens fit those in the original description (Ehara and Moraes 1998) and the redescriptions by Guanilo et al. (2008), Ferla et al. (2011) and Demite et al. (2016).

Previous records in Brazil. Paraná, Rio Grande do Sul, São Paulo, Tocantins (Demite et al. 2024).

Euseius mesembrinus (Dean, 1957)

Typhlodromus mesembrinus - Dean, 1957: 165. Amblyseius (Euseius) ho - De Leon, 1965a, p. 125 (synonym by

Lopes et al. 2015).

Amblyseius brazilli - El-Banhawy, 1975, p. 549 (synonym by Lopes et al. 2015).

Specimens examined – Dom Pedrito – P8: plant 8, XI–2022 (2 \bigcirc \bigcirc).

Two adult females measured: dorsal shield 337–346 long and 233–242 wide, *j1* 26–28, *j3* 27–29, *j4* 11, *j5* 10–11, *j6* 11–12, *J2* 12–14, *J5* 6, *z2* 14, *z4* 17–20, *z5* 11–12, *Z1* 13, *Z4* 15, *Z5* 56–59, *s4* 24–27, *S2* 15–16, *S4* 18–20, *S5* 18–21, *r3* 14, *R1* 11–1221–24, *Sge* III 27–29, *Sti* III (broken), *Sge* IV 31–36, *Sti* IV 29, *St* IV 45–54, *st1–st3* 58–59, *st2–st2* 67–71, *st5–st5* 76, ventrianal shield 109 (108–110) long, 53–59 wide at *ZV2* level, 69–70 wide at anus level; spermathecal calyx 18 long; fixed cheliceral digit 23–25 long, with four teeth, movable digit 22–23 long, with one tooth.

Remarks. The measurements of the examined female specimens fit those in the redescriptions by Ferla et al. (2011), Moraes et al. (2013), Lopes et al. (2015) and Ferragut and Navia (2017).

Previous records in Brazil. Paraíba, Pernambuco, Rio de Janeiro, Rio Grande do Sul, São Paulo (Demite et al. 2024).

Euseius sibelius (De Leon, 1962)

Amblyseius (Typhlodromalus) sibelius - De Leon, 1962: 21. Amblyseius (Euseius) subalatus - De Leon, 1965a: 127.

Specimens examined – São Borja – P17: plant 3, VI–2022 (1♀).

Measurements of a single female collected: dorsal shield 253 long and 176 wide, *j1* and *j3* (broken), *j4* 15, *j5* 17, *j6* 19, *J2* 20, *J5* 7, *z2* 23, *z4* 24, *z5* 19, *Z1* 19, *Z4* 19, *Z5* 49, *s4* 26, *S2* 20, *S4* 20, *S5* 18, *r3* 26, *R1* 13, *Sge* IV (broken), *Sti* IV 17, *St* IV 25, *st1–st3* 55, *st2– st2* 60, *st5–st5* 51, ventrianal shield 86 long, 45 wide at *ZV2* long, 55 wide at anus level; spermathecal calyx 22 long; fixed cheliceral digit 20 long, with three teeth, movable digit 19 long, with one tooth.

Remarks. The measurements of the single specimen examined fit those in the descriptions of De Leon (1962, 1965a) and redescriptions by Lofego et al. (2009), Ferla et al. (2011) and Demite et al. (2017). This species has also been found in grapevines and apple (*Malus domestica* Borkh, Rosaceae) orchards (Ferla and Moraes 1998; Ferla et al. 2011).

Previous records in Brazil. Bahia, Ceará, Distrito Federal, Espírito Santo, Goiás, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Paraná, Paraíba, Pernambuco, Piauí, Rio Grande do Sul, Santa Catarina, São Paulo (Demite et al. 2024).

Genus Iphiseiodes De Leon

Iphiseiodes moraesi Ferla and Silva, 2011

Iphiseiodes moraesi - Ferla and Silva, 2011: 106.

Specimens examined – Encruzilhada do Sul – P9: S. brasiliensis, XII– 2021 (1).

Measurements of a single female collected: dorsal shield 503 long and 396 wide, *j*1 22, *j*3 26, *j*4 2, *j*5 2, *j*6 2, *J*2 4, *J*5 5, *z*2 3, *z*4 3, *z*5 4, *Z*1 6, *Z*4 160, *Z*5 227, *s*4 154, *S*2 3, *S*4 5, *S*5 6, *r*3 4, *R*1 4, *Sge* I 43, *St* I 72, *Sge* II 36, *Sti* II 28, *Sge* III 63, *Sti* III 40, *Sge* IV 134, *Sti* IV 92, *St* IV 85, *st1–st3* 53, *st2–st2* 80, *st5–st5* 105, ventrianal shield 143 long, 175 wide at *ZV2* level, 130 wide at anus level: spermathecal calyx 4 long; fixed cheliceral digit 32 long, with eight teeth, movable digit 31 long, with one tooth.

Remarks. The measurements of the single female specimen examined fit those in the original description (Ferla and Silva 2011).

Previous records in Brazil. Rio Grande do Sul, Santa Catarina.

Iphiseiodes zuluagai Denmark and Muma, 1972

Iphiseiodes zuluagai - Denmark and Muma, 1972: 23.

Specimens examined – Capivari do Sul – P12: A. montividensis, III– 2022 ($2 \bigcirc \bigcirc$); Dom Pedrito – P7: A. montevidensis, V–2022 ($1 \bigcirc$).

Three adult females measured: dorsal shield 420 (371–458) long and 349 (333–364) wide, *j*1 24 (23–25), *j*3 30 (29–33), *j*4 5, *j*5 4, *j*6 4, *J*2 5, *J*5 5, *z*2 5, *z*4 5, *z*5 4, *Z*1 5, *Z*4 5, *Z*5 132 (129–135), *s*4 116 (113– 117), *S*2 4, *S*4 6, *S*5 5, *r*3 7 (6–8), *R*1 7 (7–8), *Sge* I 44 (30–53), *Sge* II 31 (27–36), *Sge* III 47 (36–55), *Sti* III 26 (24–28), *Sge* IV 93 (90–96), *Sti* IV 58 (55–62), *Sti* IV 37 (34–40), *st1–st3* 54 (53–55), *st2–st2* 87 (85–89), *st5–st5* 113 (105–119), ventrianal shield 112 (107–121) long, 130 wide at *ZV2* level, 121 (119–122) wide at anus level: spermathecal calyx not visible: fixed cheliceral digit 34 (34–36) long, with 12 teeth, movable digit 31 (28–33) long, with one tooth.

Remarks. The measurements of the examined female specimens fit those in the original description (Denmark and Muma 1972) and the redescriptions by Moraes and Mesa (1988), Lofego et al. (2009) and Demite et al. (2017).

Previous records in Brazil. Acre, Alagoas, Amapá, Amazonas, Bahia, Ceará, Goiás, Maranhão, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Paraná, Paraíba, Pernambuco, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Rondônia, Roraima, Sergipe, São Paulo, Tocantins (Demite et al. 2024).

Genus Neoseiulus Hughes

Neoseiulus californicus (McGregor, 1954)

Typhlodromus californicus - McGregor, 1954: 89.

Specimens examined – São Vicente do Sul – P1: Vernonanthura nudiflora (Less.) H. Rob., III–2021 (1 \mathcal{Q}), P2: B. dracunculifolia, III–2021 (1 \mathcal{Q}), P2: B. articulata, VIII–2022 (1 \mathcal{Q}); Dom Pedrito – P8: B. crispa Spreng., VIII–2022 (1 \mathcal{Q}); Capivari do Sul – P12: Bidens pilosa L., III–2021 (1 \mathcal{Q}); Sant'Ana do Livramento – P18: S. brasiliensis, V–2022 (1 \mathcal{Q}).

Six adult females measured: dorsal shield 345 (320–385) long and 162 (150–175) wide, *j1* 19 (17–21), *j3* 23 (20–26), *j4* 18 (16–21), *j5* 19 (17–20), *j6* 22 (19–25), *J2* 26 (24–28), *J5* 12 (10–13), *z2* 23 (20– 25), *z4* 23 (19–27), *z5* 20 (17–21), *Z1* 25 (20–28), *Z4* 45 (39–50), *Z5* 66 (62–71), *s4* 28 (24–33), *S2* 32 (30–34), *S4* 31 (29–33), *S5* 27 (22–30), *r3* 21 (19–22), *R1* 21 (20–22), *Sge* IV 48 (40–54), *st1–st3* 64 (62–70), *st2–st2* 61 (58–67), *st5–st5* 64 (62–68), ventrianal shield 116 (103– 136) long, 99 (91–110) wide at *ZV2* level, 88 (77–97) wide at anus level; spermathecal calyx 11 (10–11) long; fixed cheliceral digit 26 (25–27) long, with three teeth, movable digit 25 (21–27) long, with one tooth.

Remarks. The measurements of the examined female specimens fit those in the redescriptions by Guanilo et al. (2008), Ferla et al. (2011), Beaulieu and Beard (2018) and Ferragut and Navia (2022).

Previous records in Brazil. Bahia, Rio Grande do Sul, São Paulo (Demite et al. 2024).

Neoseiulus tunus (De Leon, 1967)

Typhlodromips tunus - De Leon 1967: 29.

Neoseiulus neotunus - (Denmark and Muma 1973): 255 (synonymy by Cavalcante et al. 2017: 593).

Specimens examined – Encruzilhada do Sul – P11: Vernonanthura tweediana (Baker) H.Rob., VIII–2022 ($2 \bigcirc \bigcirc$); Capivari do Sul – P12: Conyza bonariensis (L.) Cronquist, III–2021 ($2 \bigcirc \bigcirc$); Dom Pedrito – P8: Stenocephalum megapotamicum (Spreng.) Sch.Bip., VIII– 2021 ($2 \bigcirc \bigcirc$).

Six adult females measured: dorsal shield 302 (293–321) long and 177 (170–188) wide at the level of *s4*, *j1* 23 (21–26), *j3* 29 (25– 32), *j4* 13 (11–15), *j5* 14 (11–16), *j6* 18 (14–22), *J2* 21 (14–26), *J5* 8, *z2* 24 (22–26), *z4* 31 (25–37), *z5* 14 (12–18), *Z1* 25 (18–31), *Z4* 50 (42– 54), *Z5* 70 (67–72), *s4* 43 (37–49), *S2* 35 (29–39), *S4* 23 (17–32), *S5* 15 (12–19), *r3* 26 (23–34), *R1* 19 (16–21), *Sge* IV 21 (15–27), *Sti* IV 18 (17–20), *St* IV 32 (28–37), *st1–st3* 60 (56–63), *st2–st2* 65 (61–70), *st5– st5* 63 (59–68), ventrianal shield 104 (95–109) long, 76 (73–80) wide at *ZV2* level, 66 (55–81) wide at anus level; spermathecal calyx 10 (9–11) long; fixed cheliceral digit 31 (27–35) long, with six teeth, movable digit 28 (26–30) long, with three teeth.

Remarks. The measurements of the examined female specimens fit those in the original description (De Leon 1967) and redescriptions by Denmark and Muma (1973), Guanilo et al. (2008), and Demite et al. (2017).

Previous records in Brazil. Bahia, Ceará, Goiás, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Paraná, Rio Grande do Sul, Santa Catarina, São Paulo (Demite et al. 2024).

Genus Proprioseiopsis Muma

Proprioseiopsis citri (Muma, 1962)

Amblyseius citri - Muma, 1962: 1.

Specimens examined – Sant'Ana do Livramento – P18: A. montevidensis, V–2022 (1 \bigcirc).

Measurements of single female collected: dorsal shield 335 long and 240 wide, *j1* 26, *j3* 36, *j4* 5, *j5* 5, *j6* 5, *J5* 7, *z2* 19, *z4* 10, *z5* 5, *Z1* 5, *Z4* 91, *Z5* 78, *s4* 74, *S2* 8, *S4* 8, *S5* 8, *r3* 21, *R1* 13, *Sge* III 23, *Sti* III 25, *Sge* IV 61, *Sti* IV 42, *St* IV 57, *st1*–*st3* 65, *st2*–*st2* 75, *st5*–*st5* 70, ventrianal shield 110 long, 110 wide at *ZV2* level, 97 wide at anus level; spermathecal calyx 25 long; fixed cheliceral digit 27 long, with seven teeth, movable digit 26 long, with two teeth.

Remarks. The measurements of the single female examined fit those in the redescriptions by Denmark and Muma (1970) and Santos et al. (2017). This is the first record of this species in Rio Grande do Sul and for native Asteraceae plants in this biome.

Previous records in Brazil. São Paulo (Demite et al. 2024).

Proprioseiopsis dominigos (El-Banhawy, 1984)

Amblyseius dominigos - El-Banhawy, 1984: 130.

Specimens examined – Encruzilhada do Sul – P9: S. brasiliensis, XII–2021 (1 $^{\circ}$).

Measurements of single female collected: dorsal shield 455 long and 352 wide, *j*1 31, *j*3 100, *j*4 4, *J*5 5, *z*4 35, *Z*1 6, *Z*4 140, *Z*5 134, *s*4 131, *S*2 7, *S*5 6, *r*3 13, *R*1 7, *Sge* I 28, *Sge* II 27, *Sge* III 24, *Sti* III 30, *Sge* IV 60, *Sti* IV 44, *St* IV 56, *st*1–*st*3 63, *st*2–*st*2 75, *st*5–*st*5 114, ventrianal shield 119 long, 133 wide at *ZV*2 long, 136 wide at the anus level; spermathecal calyx 20 long; fixed cheliceral digit 39 long, with four teeth, movable digit 38 long, with two teeth. Setae j5, j6, *z*2, *z*5, and S4 not visible.

Remarks. The measurements of the single female specimen examined fit those the original description (El-Banhawy 1984) and redescription by Moraes et al. (2013), except for the longer macrosetae of *Sg* IV, *Sti* IV, and *St* IV (60, 44, and 56, respectively).

Previous records in Brazil. Amazonas, Bahia, Espírito Santo, Goiás, Mato Grosso, Minas Gerais, Rio de Janeiro, Rio Grande do Sul, Roraima, Santa Catarina, São Paulo (Demite et al. 2024).

Proprioseiopsis ovatus (Garman, 1958)

Amblyseiopsis ovatus - Garman, 1958: 78.

- Proprioseiopsis antonellii Congdon, 2002: 15 (synonym by Denmark & Evans, 2011).
- Proprioseiopsis cannaensis Muma, 1962, p. 4 (synonym by Denmark & Evans, 2011).
- *Proprioseiopsis hudsonianus* Chant & Hansell, 1971: 723 (synonym by Denmark & Evans, 2011).
- Proprioseiopsis peltatus Van der Merwe, 1968: 119 (synonym by Tseng, 1983).
- Proprioseiopsis parapeltatus Wu & Chou, 1981: 274 (synonym by Tseng, 1983).
- Specimens examined Dom Pedrito P7; A. montevidensis, V–2022 $(2 \bigcirc \bigcirc)$.

Two adult females measured: dorsal shield 325–375 long and 280–282 wide, *j1* 30–31, *j3* 66–70, *j4* 6, *j5* 5, *j6* 6, *J5* 7–10, *z2* 35–42, *z4* 24, *z5* 6, *Z1* 20–25, *Z4* 111–121, *Z5* 87–100, *s4* 105, *S2* 17–25, *S4* 14–16, *S5* 9–11, *r3* 22–23, *R1* 12–15, *Sge* III 25–26, *Sge* IV 60–65, *Sti* IV 36–42, *St* IV 75–93, *st1–st3* 53–60, *st2–st2* 70–75, *st5–st5* 94–117, ventrianal shield 107–110 long, 107–117 wide at *ZV2* level, 91–102 wide at anus level; spermathecal calyx 15–16 long; fixed cheliceral digit 31–33 long, with five teeth, movable digit 25–26 long, with one tooth.

Remarks. The measurements of the examined female specimens fit those in the redescriptions by Moraes and McMurtry (1983), Moraes et al. (2007), Guanilo et al. (2008) and Demite et al. (2017).

Previous records in Brazil. Alagoas, Bahia, Goiás, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Paraná, Rio Grande do Sul, São Paulo (Demite et al. 2024).

Genus Typhlodromalus Muma

Typhlodromalus aripo De Leon, 1967

Typhlodromalus aripo - De Leon, 1967: 21.

Specimens examined – Capivari do Sul – P14: *C. bonariensis*, III– 2022 (1 \Im); Dom Pedrito – P8: *A. montevidensis*, V–2022 (2 \Im \Im), P7: *Baccharis breviseta* DC., VIII–2022 (1 \Im); São Vicente do Sul – P1: *C. macrocephalum*, XI–2021 (1 \Im), *V. nudiflora* (Less.) H. Rob., XI–2021 (1 \Im), *Solidago chilensis* Meyen, VIII–2022 (1 \Im). Seven adult females measured: dorsal shield 352 (326–365) long and 208 (187–219) wide, *j1* 31 (29–33), *j3* 35 (32–39), *j4* 12 (10–18), *j5* 11 (10–14), *j6* 14 (12–16), *J2* 15 (14–15), *J5* 9 (8–10), *z2* 19 (18–20), *z4* 31 (27–36), *z5* 9 (8–11), *Z1* 20 (18–22), *Z4* 45 (42–48), *Z5* 65 (61–72), *s4* 44 (40–51), *S2* 33 (31–38), *S4* 22 (21–27), *S5* 12 (10– 13), *r3* 21 (17–22), *R1* 18 (16–21), *Sge* IV 42 (30–49), *Sti* IV 22 (18–26), *St* IV 68 (58–76), *st1–st3* 68 (64–70), *st2–st2* 65 (64–66), *st5–st5* 79 (73–82), ventrianal shield 120 (109–125) long, 69 (59–75) wide at *ZV2* level, 69 (63–72) wide at anus level; spermathecal calyx 18 (16– 19) long; fixed cheliceral digit 33 (30–35) long, with nine teeth, movable digit 31 (30–33) long, with three teeth.

Remarks. The measurements of the examined adult females fit those in the original description (De Leon 1967) and redescriptions by Moraes and McMurtry (1983), Moraes and Mesa (1988) and Guanilo et al. (2008).

Previous records in Brazil. Alagoas, Amazonas, Bahia, Ceará, Espírito Santo, Goiás, Maranhão, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Paraná, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, Rio Grande do Sul, Santa Catarina, Sergipe, Tocantins (Demite et al. 2024).

Genus Typhlodromips De Leon

Typhlodromips mangleae De Leon, 1967

Typhlodromips mangleae - De Leon, 1967: 28.

Specimens examined – Capivari do Sul – P13: C. laevigata, I–2022 (1°) ; São Vicente do Sul: P3 - C. macrocephalum, XI–2021 (1°) .

Two adult females measured: dorsal shield 330–333 long and 222–227 wide, *j1* 18, *j3* 20, *j4* 10, *j5* 9, *j6* 10, *J2* 12–13, *J5* 9–10, *z2* 10–11, *z4* 10–11, *z5* 9, *Z1* 12, *Z4* 34–36, *Z5* 70–76, *s4* 21–24, *S2* 10, *S4* 8–9, *S5* 7–8, *r3*11–15, *R1* 11–12, *Sge* | 25–27, *Sge* || 24–25, *Sge* ||| 30, *Sge* |V 40–45, *Sti* |V 35–36, *St* |V 50–51, *st1–st3* 58–59, *st2–st2* 63–68, *st5–st5* 61–65, ventrianal shield 110–115 long, 89–90 wide at *ZV2* long, 84–91 wide at anus level; spermathecal calyx 7 long; fixed cheliceral digit 28–29 long, with six teeth, movable digit 21–27 long, with three teeth.

Remarks. The measurements of the examined female specimens fit those in the original description (De Leon 1967) and redescriptions by Guanilo et al. (2008), Lofego et al. (2009), Rocha et al. (2015) and Souza et al. (2015).

Previous records in Brazil. Alagoas, Bahia, Ceará, Maranhão, Mato Grosso do Sul, Minas Gerais, Paraná, Pernambuco, Rio Grande do Sul, São Paulo, Tocantins (Demite et al. 2024).

Phytoseiinae Berlese

Genus Phytoseius Ribaga

Phytoseius guianensis De Leon, 1965

Phytoseius (Pennaseius) guianensis - De Leon 1965b: 18.

Specimens examined - Encruzilhada do Sul – P10: *C. bonariensis*, III–2022 (1 $^{\circ}$); São Francisco de Assis – P15: *B. articulata*, XII–2021 (1 $^{\circ}$), *Achyrocline satureioides* (Lam.) DC., VII–2022 (1 $^{\circ}$); São Luiz Gonzaga – P4: *A. montevidensis*, XII–2021 (3 $^{\circ}$ $^{\circ}$); São Vicente do Sul – P1: *C. macrocephalum*, III–2022 (1 $^{\circ}$), P3: *C. bonariensis*, VIII– 2022 (1 $^{\circ}$).

Eight adult females measured: dorsal shield 284 (270–295) long and 149 (144–156) wide, *j1* 20 (18–21), *j3* 20 (17–23), *j4* 15 (13–16), *j5* 16 (14–17), *j6* 18 (15–20), *J2* 19 (18–20), *J5* 8 (6–8), *z2* 17 (14–18), *z3* 24 (22–26), *z4* 23 (20–26), *z5* 16 (14–18), *Z4* 25 (20–28), *Z5* 42 (40–46), *s4* 31 (29–33), *s6* 32 (28–35), *r3* 29 (27–30), *R1* 18 (16–21), *St* IV 25 (23–28), *st1–st3* 61 (60–63), *st2–st2* 65 (63–69), *st5–st5* 53 (51– 55), ventrianal shield 96 (93–100) long, 45 (41–46) wide at ZV2 level, 49 (46–52) wide at anus level; spermathecal calyx 10 (8–11) long; fixed cheliceral digit 26 (25–27) long, with four teeth, movable digit 26 (24–27) long, with three teeth.

Remarks. The measurements of the examined female specimens fit those in the original description (De Leon 1965b) and redescriptions by Guanilo et al. (2008, 2008), Silva et al. (2013) and Demite et al. (2017).

Previous records in Brazil. Alagoas, Bahia, Ceará, Espírito Santo, Goiás, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Paraná, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, Rio Grande do Sul, Santa Catarina, Sergipe, São Paulo, Tocantins (Demite et al. 2024).

Typhlodrominae Wainstein

Genus Metaseiulus Muma

Metaseiulus (Metaseiulus) cornus (De Leon, 1957)

Typhlodromus cornus - De Leon, 1957: 142.

Metaseiulus (Metaseiulus) cornus - Chant and Yoshida–Shaul, 1983: 1053.

Metaseiulus cornus - Ferla et al. 2011: 25.

Specimens examined - Dom Pedrito – P7: Austroeupatorium inulaefolium (Kunth) R.M. King & H. Rob., VIII–2022 (1 \bigcirc); Sant'Ana do Livramento – P18: *B. articulata*, XI–2021 (2 \bigcirc \bigcirc).

Three adult females measured: dorsal shield 320 (306–327) long and 179 (161–197) wide, *j*1 22 (21–23), *j*3 17 (14–22), *j*4 14 (13–15), *j*5 15 (14–16), *j*6 16, *J*2 20 (18–21), *J*5 14 (13–15), *z*2 16 (15–17), *z*3 19 (17–20), *z*4 22 (21–22), *z*5 14 (13–16), *Z*4 35, *Z*5 46 (44–47), *s*4 24 (22–25), *s*6 25 (24–26), *S*5 20 (20–21), *r*3 14 (13–16), *R*1 24 (24–25), *s*1–*s*t3 57 (57–62), *s*2–*s*t2 54 (54–59), *s*5–*s*t5 59 (56–61), ventrianal shield 105 (93–111) long, 77 (71–83) wide at *ZV*2 level, 72 (70–76) wide at anus level; spermathecal calyx 16 (15–16) long; fixed cheliceral digit 26 (26–27) long, with three teeth, movable digit 26 (25–28) long, with one tooth.

Remarks. The measurements of the examined adult females fit those in the original description (De Leon 1957) and redescription by Chant and Yoshida-Shaul (1983), except for the longer setae *Z4*, *Z5*, and *s4* (35, 46, and 24, respectively). However, the measurements agree with those in the redescription provided by Ferla et al. (2011).

Previous records in Brazil. Rio Grande do Sul, Roraima, São Paulo (Demite et al. 2024).

Metaseiulus (Metaseiulus) eiko (El-Banhawy, 1984)

Typhlodromus eiko - El – Banhawy, 1984: 138.

Specimens examined - São Borja - P17: *B. crispa*, XII-2022 (1 $^{\circ}$); Sant'Ana do Livramento - P18: *B. dracunculifolia*, XI-2022 (1 $^{\circ}$), *B. articulata*, VIII-2022 (2 $^{\circ}$ $^{\circ}$); São Francisco de Assis - P15: *Lessingianthus macrocephalus* (Less.) H. Rob., XII-2022 (2 $^{\circ}$ $^{\circ}$).

Six adult females measured: dorsal shield 301 (297–307) long and 163 (156–170) wide, *j*1 20 (18–21), *j*3 20 (19–20), *j*4 14 (13–15), *j*5 13 (13–14), *j*6 15, *J*2 19 (18–21), *J*5 12 (10–13), *z*2 17 (16–18), *z*3 20 (19–21), *z*4 20 (19–21), *z*5 15 (14–16), *Z*4 32 (31–34), *Z*5 43 (40–47), *s*4 22 (20–23), *s*6 23 (20–25), *S*5 25 (24–27), *r*3 22 (21–24), *R*1 24 (20– 26), *s*11–*s*t3 60 (54–78), *s*t2–*s*t2 51 (54–78), *s*t5–*s*t5 55 (48–59), ventrianal shield 99 (96–104) long, 60 (55–62) wide at *ZV*2 level, 61 (56–65) wide at anus level; spermathecal calyx 15 (15–16) long; fixed cheliceral digit 24 (22–26) long, with two teeth, movable digit 21 (20–22) long, with one tooth. *Remarks.* The measurements of the examined female specimens fit those in the original description (El-Banhawy 1984) and the redescription by Chant and Yoshida-Shaul (1984).

Previous records in Brazil. Minas Gerais, Paraná, Rio Grande do Sul, São Paulo (Demite et al. 2024).

Genus Typhlodromus Scheuten

Typhlodromus (Anthoseius) bacchariae n. sp. Castro & Ferla

(Figures 5-7)

Diagnosis

Dorsal shield strongly reticulated, with longitudinal muscular marks between Z4 and S5 setae, with seven pairs of solenostomes and 14 pairs of poroids; dorsal setae of subequal length and smooth, except Z4, Z5, and S5 serrated and thickened. Seta S4 absent. Setae r3 and R1 inserted outside dorsal shield in females. Peritreme extending to level of *j*1. Sternal shield smooth and slightly sclerotized, with two pairs of setae st1 and st2. Setae st3 and st4 inserted on small metasternal plates, second pair of (iv2) poroids inserted in unsclerotized cuticle posterior to sternal shield. Ventrianal shield pentagonal, with four pairs of setae (JV1, JV2, JV3, and ZV2). Light reticulation at level of ZV2, horizontal muscular marks at level of JV3, strong reticulation posterior to pair of (gv3) poroids. Seta JV4 absent, JV5 smooth. Two pairs of metapodal plates. Fixed digit of chelicera with three teeth, pilus dentilis in middle of chelae, movable digit with one tooth. Spermathecal calyx cup-shaped with variations in shape and indistinct atrium. Leg IV with blunt macroseta on basitarsus.

Description

Female (n = 5)

Dorsum. Idiosomal setal pattern 12A:7B/JV–4: ZV (r3 and R1 off shield). Dorsal shield strongly reticulated, with longitudinal muscular marks between Z4 and S5 setae, with slight constriction at R1 level, bearing seven pairs of solenostomes (gd1, gd2, gd4, gd5, gd6, gd8, gd9) and 14 pairs of poroids (id1, id2, id4, id6, id11, id13, id14, idm2, idm3, idm4, idm5, idm6, idx, is1). Dorsal shield 366 (350–388) long and, 204 (196–214) wide at s6 level. Dorsal setae of subequal length and smooth, except for Z4, Z5, and S5 serrate and thick-ened. Measurements of dorsal setae: j1 25 (23–27), j3 21 (19–23), j4 14 (13–16), j5 14 (13–15), j6 17 (15–18), J2 21 (18–23), J5 13 (12–14), z2 15 (14–17), z3 18 (16–19), z4 17 (16–19), z5 14 (13–17), Z4 35 (31–39), Z5 46 (43–51), s4 23 (21–24), s6 29 (26–32), S2 28 (24–31), S5 29 (24–34), r3 16 (14–20), and R1 19 (17–23).

Venter. Ventral setal pattern 14: JV-4: ZV. Sternal shield 61 (58-65) long and 69 (67–74) wide, smooth, lightly sclerotized, posterior margin concave; with two pairs of setae (st1 and st2), one pair of poroids (iv1), setae st3 and st4 tylochorous, second pair of poroids (iv2) inserted posteriad sternal shield in unsclerotized cuticle; distance between st1-st3 64 (62-67), st2-st2 65 (63-70). Metasternal seta st4 and one pair of poroids (iv4) tylochorous. Genital shield smooth, 120 (116-126) long and, 47 (44-49) wide at level of st5, distance between st5-st5 63 (58-66). Ventrianal shield pentagonal, with light reticulation at level of ZV2, horizontal muscular marks at level of JV3, and strong reticulation posterior to pair of preanal pores gv3; 133 (127–141) long, 104 (98–110) wide at ZV2 level, and 89 (83–94) wide at anus level, with four pairs of preanal setae (JV1-JV3, and ZV2); one pair of preanal setae (Pa) and one post-anal seta (Pst); with a pair of small rounded preanal pores (qv3) and approximately on longitudinal line with JV2 setae, with distance between gv3 - gv3 40 (34-41). Three pairs of opisthogastric setae on unsclerotized cuticle (JV5, ZV1, and ZV3). Seta JV5 smooth, 35 (32–42) long. All ventral setae smooth. One small metapodal plate and one large.



Figure 5. Typhlodromus (Anthoseius) bacchariae **n. sp**. (female and male). (a) Female dorsal view of idiosoma, (b) female ventral view of idiosoma, (c) female chelicera, (d) male spermadactyl, (e) male ventral view of idiosoma, (f) female spermathecae, (g) female genu, tibia and basitarsus of leg IV.

Peritreme. Peritreme extending to j1 level.

Chelicera. Fixed digit 31 (30–33) long, with three teeth and pilus dentilis in middle of chela. Movable digit 29 (27–32) long, with one tooth.

Spermatheca. Calyx frequently cup – shaped, however, varying subtly in shape, 7 (6–8) long. The atrium and minor duct were not visible; therefore, atrium of spermatheca indistinct.

Legs. Length of legs: leg I 327 (320–339), leg II 280 (272–291), leg III 287 (282–296), leg IV 367 (361–385); with a single blunt macroseta on the basitarsus of leg IV: *St* IV 28 (27–30) long. Chaetotaxy of

legs as follows: Leg I: coxa 0 0/1 0/1 0, trochanter 1 0/1 0/2 1, femur 2 3/1 2/2 2, genu 2 2/1 2/1 2, tibia 2 2/1 2/1 2. Leg II: coxa 0 0/1 0/1 0, trochanter 1 0/1 0/2 1, femur 2 3/1 2/1 1, genu 2 2/0 2/0 1, tibia 1 1/1 2/1 1. Leg III: coxa 0 0/1 0/1 0, trochanter 1 1/1 0/2 0, femur 1 2/ 1 1/0 1, genu 1 2/1 2/0 1, tibia 1 1/1 2/1 1. Leg IV: coxa 0 0/1 0/0 0, trochanter 1 1/1 0/2 0, femur 1 2/1 1/0 1, genu 1 2/1 2/0 1, tibia 1 1/1 2/1 1. Leg IV: coxa 1 0/1 0/0 0, trochanter 1 1/1 0/2 0, femur 1 2/1 1/0 1, genu 1 2/1 2/0 1, tibia 1 1/1 2/1 1. Leg IV: coxa 0 0/1 0/1 0, trochanter 1 1/1 0/2 0, femur 1 2/1 1/0 1, genu 1 2/1 2/0 1, tibia 1 1/1 2/1 1. Leg IV: coxa 0 0/1 0/1 0, trochanter 1 1/1 0/2 0, femur 1 2/1 1/0 1, genu 1 2/1 2/0 1, tibia 1 1/1 2/1 1. Leg IV: coxa 0 0/1 0/0 0, trochanter 1 1/1 0/2 0, femur 1 2/1 1/0 1, genu 1 2/1 2/0 1, tibia 1 1/1 2/0 1.

Male (n = 3)

Dorsum. Idiossomal setal pattern similar to adult females (*r3* and *R1* on shield). Dorsal shield, entirely reticulate and without constriction at *R1* level; 277 (260–285) long and 180 (176–185) wide.



Figure 6. Typhlodromus (Anthoseius) bacchariae n. sp. (female). Morphological variation of spermatheca.



Figure 7. Typhlodromus (Anthoseius) bacchariae **n. sp**. (female). (a) Dorsal view of the podosomal region with position of the gd1 solenostome (indicated by red arrows), (b) view of sternal shield and position of poroid iv2 inserted into the unsclerotinized cuticle anterior to st3 (indicated by red arrows).

Dorsal setae shape and length similar to adult females. Measurements of dorsal setae: *j*1 20 (16–22), *j*3 15 (15–16), *j*4 12 (12–13), *j*5 12 (10–13), *j*6 14 (14–15), *J*2 16 (15–17), *J*5 12 (11–13), *z*2 12 (12–13), *z*3 13 (12–15), *z*4 15 (14–16), *z*5 12 (11–13), *Z*4 27 (26–28), *Z*5 37 (35–39), *s*4 19 (17–20), *s*6 22 (21–22), *S*2 22 (22–23), *S*5 21 (21–22), *r*3 15 (15–16), *R*1 17 (16–18).

Venter. Sternogenital shield mostly smooth, with lateral striae, with five pairs of setae (*st1-st5*). Distance between *st1-st5* 115 (111–121), *st2-st2* 58 (56–63), *st5-st5* 43 (42–44). Ventrianal shield triangular, reticulate, 122 (120–124) long and 159 (158–160) wide at anterior corners, with six pairs of preanal setae (*JV1- JV3* and *ZV1-ZV3*) and two pairs of poroids and one pair of small, rounded gland opening (*gv3*). Seta *JV5* smooth, 19 (18–20) long.

Peritreme. Similar to adult females.

Chelicera. Fixed digit 25 (24–25) long with two median and one distal teeth; movable digit 22 (21–22) long with one tooth. Spermatodactyl shaft U-shaped, 24 (23–25) long.

Legs. Length of legs: leg I 279 (268–294), leg II 230 (219–247), leg III 232 (219–241), leg IV 302 (291–319); with a single blunt macroseta on basitarsus of leg IV: *St* IV 23 (21–24) long. Chaetotaxy formula of genu II and genu III as in females.

Remarks. Typhlodromus (Anthoseius) bacchariae **n. sp**. belongs to the arizonicus species group by the absence of setae *S5* and *JV4* (Chant and McMurtry 1994), which currently comprises only two species: *T.* (*A.*) arizonicus (Tuttle and Muma 1973) and *T.* (*A.*) demoraesi Lofego & Feres, 2007. The new species has serrated dorsal setae *Z4*, *Z5*, *S5*, sternal shield with two pairs of setae *St1*, *St2*,

atrium of spermathecal calyx indiscernible while in *T*. (*A*.) *arizonicus* dorsal setae *Z4*, *Z5*, *S5* smooth, sternal shield with three pairs of setae *St1-St3*, atrium of spermathecal calyx C-shaped. *T*. (*A*.) *bacchariae* **n**. **sp**. differs from *T*. (*A*.) *demoraesi* by serrated dorsal seta *S5*, reticulated ventrianal shield of female, presence of blunt-shaped macroseta *StIV* on leg IV while seta *S5* smooth, smooth ventrianal shield of female, absence of macrosetae on leg IV in *T*. (*A*.) *demoraesi*.

Type material. Holotype female collected at Encruzilhada do Sul (30°41'45.94''S, 052°43'54.02''W), Rio Grande do Sul, Brazil, 08/VIII/ 2022, on *B. dracunculifolia*.

Two paratype females and two paratype males collected at Sant'Ana do Livramento (30°48'24.50"S, 055°36'54.86"W), Rio Grande do Sul, Brazil, 13/XI/2022, on *B. articulata*. The specimens were collected by the senior author of this study. Type specimens will be deposited in the Department of Entomology and Acarology, Escola Superior de Agricultura Luiz de Queiroz (ESALQ), University of São Paulo, Piracicaba – SP, Brazil.

Etymology. The new species name *bacchariae* refers to *"Baccharis"* the host plant genus, from which the type specimens were collected.

Dichotomous keys for arizonicus species group

- 1. Setae Z4 and Z5 serrated, absence of macroseta in St IV, calyx of the spermatheca cylindrical
- .. **Typhlodromus (Anthoseius) demoraesi** (Lofego and Feres 2006).

2. Three pairs of setae on sternal shield, *S5* setae smooth, macrosetae on *St* IV setiform

...... **Typhlodromus (Anthoseius) arizonicus** (Tuttle and Muma 1973).

 Two pairs of setae on the sternal shield, 55 setae serrated, macrosetae on St IV blunt

..... Typhlodromus (Anthoseius) bacchariae n. Sp.

Typhlodromus (Anthoseius) ornatus (Denmark and Muma, 1973)

Amblydromella ornata - Denmark and Muma, 1973: 270. Typhlodromus ornatus - Ferla et al. 2011: 25.

Specimens examined – São Francisco de Assis – P15: *L. macroce-phalus*, XII-2021 (1♀).

Measurements of a single female collected: dorsal shield 365 long and 285 wide, *j*1 21, *j*3 17, *j*4 11, *j*5 11, *j*6 12, *J*2 15, *J*5 12, *z*2 12, *z*3 15, *z*4 15, *z*5 11, *Z*4 22, *Z*5 39, *s*4 17, *s*6 20, *S*2 20, *S*4 22, *S*5 20, *r*3 18, *R*1 19, *Sge* IV 14, *Sti* IV 16, *St* IV 25, *st*1–*st*3 75, *st*2–*st*2 60, *st*5–*st*5 56, ventrianal shield 125 long, 95 wide at *ZV2* level, 88 wide at anus level; spermathecal calyx not visible; fixed cheliceral digit 30 long, with four teeth, movable digit 31 long, with two teeth.

Remarks. The measurements of the single female examined fit those in the original (Denmark and Muma 1973) and the redescriptions by Lofego et al. (2004), Ferla et al. (2011) and Rocha et al. (2015). This is the first record of this species in Asteraceae plants native to this biome.

Previous records in Brazil. Bahia, Mato Grosso do Sul, Pernambuco, Rio Grande do Sul, Roraima, São Paulo (Demite et al. 2024).

Typhlodromus (Anthoseius) transvaalensis (Nesbitt, 1951)

Kampimodromus transvaalensis - Nesbitt, 1951: 55. Typhlodromus (Typhlodromus) transvaalensis - Chant 1959: 60.

Specimens examined – Capivari do Sul – P12: *E. hieraciifolius*, VIII–2022 (1 \mathcal{Q}).

Measurements of a single female collected: dorsal shield 320 long and 190 wide, *j*1 (broken), *j*3 41, *j*4 34, *j*5 34, *j*6 35, *J*2 45, *J*5 10, *z*2 25, *z*3 39, *z*4 45, *z*5 28, *Z*4 56, *Z*5 58, *s*4 47, *s*6 48, *S*2 56, *S*4 46, *S*5 9, *r*3 33, *R*1 40, *Sge* IV 20, *St* IV 45, *st*1–*st*3 58, *st*2–*st*2 69, *st*5–*st*5 72, ventrianal shield 100 long, 70 wide at *ZV2* level, 72 wide at anus level; spermathecal calyx 10 long; fixed cheliceral 31 long, with three teeth, movable digit 30 long, with one tooth.

Remarks. The measurements of the single female examined fit those in the redescription by Moraes and Mesa (1988) and Ferla et al. (2011). This is the first record of this species on Asteraceae plants and in the native environment of this biome.

Previous records in Brazil. Amazonas, Bahia, Mato Grosso, Pernambuco, Rio Grande do Sul, São Paulo, Tocantins (Demite et al. 2024).

Discussion

The physiographic regions present different diversity. The richness and similarity were higher in A3 and A4, while the lowest richness and higher abundance was observed in A1. All the subregions are located in a rural area, but the collection point in A1 was close to soybean cultivation. The greater abundance in this area may be linked to the availability of prey, shelter, and habitat fragmentation. The abundance of mites in anthropic environments may be related to low environmental heterogeneity and great availability of food, as is the case in monocultures. In agroecosystems, phytophagous species have better possibilities of reaching large population levels due to the lower diversity of natural enemies (Altieri et al. 2003; Tixier 2018).

A comparative study conducted in different types of vegetation (pastures, excluding pastures and riparian forests) was carried out in a preservation area in the shrubland sub – region of this biome. This research found 293 specimens of phytoseiid mites, comprising 22 species associated with 33 species of native plants (Toldi et al. 2021); while 34 species were found in 37 plant species in Cerrado biome (Demite et al. 2017), 35 species were noted in 40 plants species in the Pantanal biome; 11 phytoseiid species associated with Myrtaceae in the Caatinga biome (Rodrigues et al. 2020); and in the Atlantic Forest biome 23 species of phytoseiid mites in 45 plant species (Ferla and Moraes 2002), and 54 species in 187 plant species (De Castro and Moraes 2010).

In general, phytoseiid mites are the most abundant and diverse predators on cultivated or native plants. Typhlodromalus aripo and P. guianensis were more abundant in areas close to crops, while E. inouei was abundant in grassland and riparian forest areas. Typhlodromalus aripo was previously associated with pastures and pasture excluded areas, being recognized as an indicator species for pasture excluded environments (Toldi et al. 2021). The same species is also associated with spontaneous plants close to vineyards and in unstable environments with extreme windy conditions (Moura et al. 2013; Rocha et al. 2015). The greater interaction of T. aripo with the largest number of plants (11) may be related to the ability of this species to feed on different types of food, such as mites, pollen, and fungal spores (Bakker et al. 1993; Gnanvossou et al. 2003). Its association with several native plants may also be related to the species successfully completing its immature development on various plant species (McMurtry et al. 2013).

Species of the genus *Euseius* are frequently found on plants native to the southern region of Brazil. *Euseius inouei*, found for the first time in Rio Grande do Sul in native and cultivated plants (Ferla and Moraes 2002), was the most common species of the genus, associated with five plant species. Although it is known that the species can feed on pollen and other mites, mainly those belonging to the families Eriophyidae, Tarsonemidae, Tenuipalpidae, and Tetranychidae (McMurtry and Croft 1997), little is known about its biology, ecology or ability to control herbivore populations.

Neoseiulus californicus is commonly found associated with soybean (*Glycine max* (L.) Merr., Fabaceae) crops, being widely studied in the biological control of *Tetranychus urticae* Koch (Escudero and Ferragut 2005; McMurtry et al. 2013; Reichert et al. 2014). Their interaction with the six sampled plant species probably occurred due to the proximity of the collected plants to crops, providing temporary habitat and possible food sources.

Phytoseius guianensis, the second most abundant species, has been found associated with 17 plants in cassava (*Manihot esculenta* Crantz, Euphorbiaceae) cultivation in northeastern Brazil (Moraes et al. 1993). It has also been reported on cultivated and native plants in Rio Grande do Sul (Ferla and Moraes 2002).

The number of interactions between mites and plants obtained in this study was lower than that found by Toldi et al. (2021), however, the robustness of the interaction networks observed by the authors were similar to those documented in this study. The variation in the number of interactions can be attributed to distinct groups of plants. The enhanced connectivity in the interaction networks probably arises from the predatory nature of these mites and absence of specialization in relation to the host, unlike networks with phytophagous mites that have lower connectivity (Araújo and Daud 2018). *Aspilia montevidensis*, a creeping plant with rough trichomes, perennial cycle and common in Pampa (Fagundes et al. 2010), was the plant species with the highest number of interactions, i.e. *A. morgani*, *A. gaucho*, *I. zuluagai*, *N. tunus*, *P. guianensis*, *P. citri*, *P. ovatus*, and *T. aripo*. This plant possibly provides a greater quantity or diversity of food, such as prey, exudate, and pollen or serving as shelter against adverse factors.

The Pampa biome presents a diversity of predatory mites that are little known due to the rare studies carried out in this biome. With the constant occupation and degradation of native vegetation by livestock and monoculture, species not yet catalogued may be disappearing. In different ecosystems, it is possible to find predators that could contribute to applied biological control programmes. Therefore, monitoring and studying these environments becomes important to investigate how these mite populations maintain and evolve with the biome's environmental adversities. Furthermore, studies are suggested that evaluate the interaction between populations of phytophagous mites and predators is needed to understand these possible pest control agents.

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