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Interaction between Tephritidae (Insecta, Diptera) and plants of the family Asteraceae: new host and distribution records for the state of Rio Grande do Sul, Brazil

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ABSTRACT

Twenty species of Tephritidae (Diptera) are recorded in association with capitula of plants in the family Asteraceae. The Tephritidae genus *Tetreuaresta* is registered for Rio Grande do Sul for the first time. Five species of Tephritidae are newly recorded for Rio Grande do Sul, and new hosts are recorded for the following fly species: *Dioxyna chilensis* (Macquart), *Plaumannimyia dolores* (Hering), *Plaumannimyia imitatrix* (Hering), *Plaumannimyia miseta* (Hering), *Plaumannimyia pallens* Hering, *Tomoplagia incompleta* (Williston), *Tomoplagia matzenbacheri* Prado, Norrbom & Lewinsohn, *Tomoplagia reimoseri* Hendel, *Xanthaciura biocellata* (Thomson) and *Xanthaciura chrysura* (Thomson).

Introduction

In Tephritidae (Diptera), larvae of many species use fruits as substrate for larval development, causing economic impact on plants of agricultural interest (Aluja, 1994; Aluja and Mangan, 2008; Foote, 1967; Norrbom et al., 1999). The larvae of most species of the subfamily Tephritinae develop on plants of the family Asteraceae, inducing the formation of galls in various regions of the plants or feeding themselves, either inside the capitula or in seeds and roots (Foote, 1967; Foote et al., 1993; Norrbom, 2010; Norrbom and Prado, 2006; Prado et al., 2002).

Asteraceae is a major angiosperm family with more than 23,000 recognized species in 1,600 genera (Bremer, 1994; Jeffrey, 2006; Panero and Funk, 2008). Representatives of this family are of great economic importance and are cultivated as ornamental plants, as well as for medicines, oleaginous, perfumes, insecticides, and food. In addition, some species are invasive in agriculture and toxic to animals and man (Beretta et al., 2008). Species of Asteraceae are the principal hosts of the subfamily Tephritinae worldwide (Foote et al., 1993; Korneyev, 1999; Zwölfer, 1987). Because of the great adaptive capacity of Asteraceae, the family is amply distributed, particularly in tropical, subtropical, and temperate regions (Barroso et al., 1991).

Tephritinae, in the Neotropical Region, encompass more than 430 species and approximately 50 recognized genera (Norrbom et al., 1999). In Brazil, 80 species belonging to 18 genera have been registered in association with capitula of Asteraceae (Prado et al., 2002), and in the South region, 38 species in 13 genera have been registered (Garcia et al., 2002; Prado et al., 2002; Prado et al., 2004; Sabedot et al., 2008; Sabedot-Bordin et al., 2011).

In Rio Grande do Sul few studies have examined species of Tephritidae and their ecological interactions with Asteraceae. The fly species registered in association with that family represent 18.8% of those that occur in Brazil and 39.5% of the species occurring in the South. At this time, the Tephritidae fauna has been investigated in only five of the 497 municipalities of the state of Rio Grande do Sul (Fig. 1) (Prado et al., 2002; Prado et al., 2004). These municipalities cover the North Coast (Capão da Canoa), the Higher Plateau (Cambará do Sul), and the Central Depression (Guaíba, Gravataí and Santo Antônio da Patrulha) (Rio Grande do Sul, 1994).

Prado et al. (2002) registered in those municipalities the species *Dioxyna chilensis* (Macquart, 1843) in hosts of tribes Coreopsideae, Neurolaeneae, Senecioneae and Tageteae; *Paracantha australis* Malloch, 1933 in hosts of tribes Heliantheae and Neurolaeneae; *Plaumannimyia coelestina* (Hering, 1938), *Plaumannimyia imitatrix* (Hering, 1938), and *Plaumannimyia pallens* Hering, 1938, in hosts of tribes Astereae and Senecioneae; *Tomoplagia costalimai* Aczél, 1955; *Tomoplagia fiebrigi* Hendel, 1914; *Tomoplagia formosa* Aczél, 1955; *Tomo-*

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plagia incompleta (Williston, 1896), *Tomoplagia minuta* Hering, 1938, in hosts of tribes Eupatorieae, Gochnatieae, Heliantheae, Nassauvieae, and Vernonieae; *Xanthaciura biocellata* (Thomson, 1869), *Xanthaciura chrysura* (Thomson, 1869), and *Xanthaciura quadrisetosa* (Hendel, 1914) in hosts of tribes Coreopsideae, Eupatorieae, Heliantheae, Neurolaeneae, and Vernonieae.

Later, Prado et al. (2004) described *Tomoplagia brasiliensis* Prado, Norrbom & Lewinsohn, 2004 with occurrence in Capão da Canoa, and *Tomoplagia matzenbacheri* Prado, Norrbom & Lewinsohn, 2004 with occurrence in Guaíba. Both emerged from capitula of hosts of the tribe Vernonieae.

Thus, the objective of this work was to conduct a survey of the Tephritidae species associated with capitula of Asteraceae in the municipality of Passo Fundo, on the Medium Plateau region of Rio Grande do Sul, thus contributing to the taxonomic knowledge of Tephritidae in the state, as well as to the understanding of the interactions between these insects and their host plants.

Material and methods

A total of 102 species of Asteraceae were collected in bloom, from January to May of 2009, in rural and urban areas of the municipality of Passo Fundo, Rio Grande do Sul. Out of the 102 studied plants, only 29 species showed interactions with Tephritidae (Table 1). Capitula in the pre-anthesis stage, very dry, or with dispersing achenes were excluded, according to Prado et al. (2002).

The capitula samples were separately placed in transparent plastic bags according to their species, and transported to the Entomology laboratory of the Instituto de Ciências Biológicas of the Universidade de Passo Fundo (UPF).

In the laboratory, the capitula were stored in transparent plastic vials, sealed with a screen cover and kept in climate-controlled rooms (25 ± 2 °C, UR 70 ± 10%, and photoperiod of 12 h) for 30 days, until the insects emerged. The vials were periodically checked every two days in order to remove the emerged specimens.

Adult insects were identified according to taxonomic criteria proposed by Hendel (1928), Hering (1938a, b), Aczél (1955a, b), Foote (1980), Prado et al. (2004), and Norrbom (2010).

Plants were identified by Dr. Mara Rejane Ritter of the Departamento de Botânica, Instituto de Biociências of the Universidade Federal do Rio Grande do Sul, and Dr. Angelo Alberto Schneider of the Universidade Federal do Pampa, Campus São Gabriel.

Plant vouchers are deposited in the herbarium of the Museu Zoobotânico Augusto Ruschi (MUZAR) of the Universidade de Passo Fundo, and some duplicates are in the herbarium of the Departamento de Botânica of the Universidade Federal do Rio Grande do Sul (ICN).

Table 1.
List of species of Asteraceae sampled in Passo Fundo, Rio Grande do Sul, Brazil, with the number of plants and the number of capitula sampled; the number of Tephritidae specimens that emerged from the total capitula and the relative frequency of Tephritidae specimens per species of plant.

Tribe / Species of Asteraceae	Plants examined	Number of capitula	Number of Tephritidae	**Frequency (%)**
Anthemideae Cass.				
Artemisia verlotorum Lamotte	02	50	01	2.0
Astereae Cass.				
Baccharis anomala DC.	03	300	04	1.3
Baccharis crispa Spreng.	20	300	-	-
Baccharis dracunculifolia DC.	05	300	06	2.0
Baccharis helichrysoides DC.	10	300	11	3.6
Baccharis hirta DC.	08	300	-	-
Baccharis leptophylla DC.	05	100	-	-
Baccharis megapotamica Spreng.	03	100	01	1.0
Baccharis microdonta DC.	01	200	03	1.5
Baccharis punctulata DC.	05	300	14	4.6
Baccharis sagittalis (Less.) DC.	10	100	-	-
Baccharis spicata (Lam.) Baill.	03	300	07	2.3
Baccharis vulneraria Baker	03	300	01	0.3
Conyza bonariensis (L.) Cronquist	10	300	-	-
Conyza primulifolia (Lam.) Cuatrec. & Lourteig	20	100	16	16.0
Leptostelma maximum D. Don.	03	50	-	-
Leptostelma tweediei (Hook. & Arn.) D. J. N. Hind & G. L. Nesom	08	30	-	-
Noticastrum gnaphalioides (Baker) Cuatrec.	18	50	-	-
Solidago chilensis Meyen	02	100	-	-
Symphyotrichum graminifolium (Spreng.) G. L. Nesom	03	100	-	-
Symphyotrichum squamatum (Spreng.) G. L. Nesom	02	100	-	-
Cardueae Cass.				
Cirsium vulgare (Savi) Ten.	15	30	-	-
Cichorieae Lam. & DC.				
Crepis japonica (L.) Benth.	05	50	-	-

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Tribe Species of Asteraceae	Plants examined	Number of capitula	Number of Tephritidae	**Frequency (%)**
Hieracium commersonii Monnier	03	08	-	-
Hypochaeris radicata L.	05	30	-	-
Hypochaeris chillensis (Kunth) Britton	08	30	-	-
Lactuca serriola L.	05	50	-	-
Lactuca sp.	01	30	-	-
Sonchus oleraceus L.	10	50	-	-
Taraxacum officinale F. H. Wigg	10	30	-	-
Coreopsideae Lindl.				
Bidens pilosa L.	20	100	02	2.0
Bidens subalternans DC.	10	50	02	4.0
Bidens sulphurea (Cav.) Sch. Bip.	02	30	-	-
Coreopsis tinctoria Nutt.	05	30	-	-
Eupatorieae Cass.				
Adenostemma brasilianum (Pers.) Cass.	10	50	-	-
Austroeupatorium laetevirens (Hook. & Arn.) R. M. King & H. Rob.	04	200	-	-
Barrosoa betonicaeformis (DC.) R. M. King & H. Rob.	10	100	18	18.0
Campuloclinium macrocephalum (Less.) DC.	12	100	-	-
Chromolaena ascendens (Sch. Bip. ex Baker) R. M. King & H. Rob.	05	100	-	-
Chromolaena congesta (Hook. & Arn.) R. M. King & H. Rob.	05	100	10	10.0
Chromolaena ivaefolia (L.) R. M. King & H. Rob.	05	50	-	-
Chromolaena hirsuta (Hook. & Arn.) R. M. King & H. Rob.	10	200	06	3.0
Chromolaena laevigata (Lam.) R. M. King & H. Rob.	04	200	69	34.5
Chromolaena umbelliformis (Dusén) R. M. King & H. Rob.	02	50	-	-
Chromolaena verbenacea (DC.) R. M. King & H. Rob.	08	50	-	-
Grazielia intermedia (DC.) R. M. King & H. Rob.	01	100	-	-
Grazielia serrata (Spreng.) R. M. King & H. Rob.	02	200	14	7.0
Mikania cordifolia (L. f.) Willd.	03	300	-	-
Mikania micrantha Kunth	01	300	-	-
Mikania pinnatiloba DC.	08	100	-	-
Mikania trachypleura B. L. Rob.	04	200	-	-
Raulinoreitzia tremula (Hook. & Arn.) R. M. King & H. Rob.	01	100	-	-
Stevia collina Gardner	05	50	-	-
Symphyopappus compressus (Gardner) B. L. Rob.	05	100	-	-
Vittetia orbiculata (DC.) R. M. King & H. Rob.	05	30	-	-
Gochnatieae Panero & V.A. Funk				
Gochnatia polymorpha (Less.) Cabrera	05	200	13	6.5
Gnaphalieae (Cass.) Lecoq & Juill.				
Achyrocline satureioides (Lam.) DC.	05	50	-	-
Gamochaeta pensylvanica (Willd.) Cabrera	06	30	-	-
Lucilia acutifolia (Poir.) Cass.	10	50	-	-
Xerochrysum bracteatum (Vent.) Tzvelev	08	30	-	-
Heliantheae Cass.				
Aldama anchusifolia (DC.) E. E. Schill. & Panero	10	30	-	-
Aspilia montevidensis (Spreng.) Kuntze	20	100	27	27.0
Calyptocarpus brasiliensis (Nees & Mart.) B. Turner	15	25	-	-
Dimerostemma arnottii (Baker) M. D. Moraes	20	50	12	24.0
Eclipta prostrata (L.) L.	10	100	-	-

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List of species of Asteraceae sampled in Passo Fundo, Rio Grande do Sul, Brazil, with the number of plants and the number of capitula sampled; the number of Tephritidae specimens that emerged from the total capitula and the relative frequency of Tephritidae specimens per species of plant.

Tribe Species of Asteraceae	Plants examined	Number of capitula	Number of Tephritidae	**Frequency (%)**
Sphagneticola trilobata (L.) Pruski	10	50	-	-
Verbesina sordescens DC.	07	30	05	16.6
Xanthium strumarium L.	05	50	-	-
Inuleae Cass.				
Chevreulia acuminata Less.	10	50	-	-
Pluchea sagittalis (Lam.) Cabrera	10	100	-	-
Pseudognaphalium gaudichaudianum (DC.) Anderb.	10	200	-	-
Pterocaulon alopecuroides (Lam.) DC.	05	100	-	-
Pterocaulon balansae Chodat	10	100	-	-
Stenachaenium megapotamicum (Spreng.) Baker	05	18	-	-
Millerieae				
Acanthospermum australe (Loefl.) Kuntze	10	50	-	-
Galinsoga parviflora Cav.	15	100	-	-
Jaegeria hirta (Lag.) Less.	20	100	-	-
Smallanthus connatus (Spreng.) H. Rob.	07	35	-	-
Mutisieae Cass.				
Chaptalia excapa (Pers.) Baker	30	30	-	-
Chaptalia integerrima (Vell.) Burkart	20	20	-	-
Chaptalia runcinata Kunth	06	06	-	-
Chaptalia sinuata (Less.) Baker	40	50	-	-
Mutisia coccinea A. St.-Hil.	02	23	-	-
Trichocline catharinensis Cabrera	06	12	-	-
Nassauvieae Cass.				
Jungia selowii Less.	05	200	-	-
Trixis nobilis (Vell.) Katinas	02	200	11	5.5
Senecioneae Cass.				
Emilia fosbergii Nicolson	10	50	-	-
Erechtites hieracifolius (L.) Raf. ex DC.	10	100	-	-
Erechtites valerianifolius (Wolf) DC.	10	100	-	-
Tageteae Cass.				
Porophyllum ruderale (Jacq.) Cass.	15	100	39	39.0
Tagetes erecta L.	50	100	127	127.0
Tagetes minuta L.	04	200	-	-
Vernonieae Cass.				
Chrysolaena cognata (Less.) Dematt.	20	100	-	-
Chrysolaena flexuosa (Sims) H. Rob.	20	50	-	-
Chrysolaena platensis (Spreng.) H. Rob.	10	50	09	18.0
Elephantopus mollis Kunth	20	100	11	11.0
Lessingianthus brevifolius (Less.) H. Rob.	08	50	01	2.0
Lessingianthus glabratus (Less.) H. Rob.	30	200	-	-
Lessingianthus rubricaulis (Humb. & Bonpl.) H. Rob.	05	50	01	2.0
Orthopappus angustifolius (Sw.) Gleason	02	300	-	-
Stenocephalum megapotamicum (Spreng.) Sch. Bip.	25	100	-	-
Vernonanthura tweediana (Baker) H. Rob.	10	300	292	97.3

Table 2.
Abundance of species of Tephritidae (Tephritinae) that emerged from Asteraceae plants, listed by alphabetic order of Tephritidae genera.

Species – Tephritidae	Species – Asteraceae	Abundance	Main host Tribes
Cecidochares sp.	*Chromolaena laevigata* (Lam.) R. M. King & H. Rob.	22	Eupatorieae Cass.
Dictyotrypeta sp. 1	*Aspilia montevidensis* (Spreng.) Kuntze	11	Heliantheae Cass.
Dictyotrypeta sp. 2	*Vernonanthura tweediana* (Baker) H. Rob.	01	Vernonieae Cass.
Dioxyna chilensis (Macquart, 1843)	*Porophyllum ruderale* (Jacq.) Cass.	09	Tageteae Cass.
	Tagetes erecta L.[b]	127	
Dioxyna peregrina (Loew, 1873)[a]	*Bidens pilosa* L.	02	Coreopsideae Lindl.
Dyseuaresta sp.	*Aspilia montevidensis*	10	Heliantheae
Euarestoides sp.	*Gochnatia polymorpha* (Less.) Cabrera	08	Gochnatieae Panero & V.A. Funk
Plaumannimyia coelestina (Hering, 1938)	*Baccharis dracunculifolia* DC.	01	Astereae Cass.
	Baccharis helichrysoides DC.	06	
Plaumannimyia dolores (Hering, 1938)[a]	*Baccharis anomala* DC.[b]	04	Astereae
Plaumannimyia imitatrix (Hering, 1938)	*Baccharis vulneraria* Baker[b]	01	Astereae Gochnatieae
	Baccharis dracunculifolia	01	
	Baccharis megapotamica Spreng.[b]	01	
	Baccharis punctulata DC.	01	
	Baccharis spicata (Lam.) Baill.[b]	03	
	Gochnatia polymorpha	03	
Plaumannimyia miseta (Hering, 1938)[a]	*Baccharis helichrysoides*[b]	05	Astereae Gochnatieae
	Baccharis punctulata[b]	06	
	Gochnatia polymorpha[b]	02	
Plaumannimyia pallens Hering, 1938	Baccharis dracunculifolia	04	Astereae
	Baccharis microdonta DC.[b]	03	
	Baccharis punctulata	07	
	Baccharis spicata[b]	04	
Tetreuaresta obscuriventris (Loew, 1873)[a]	*Elephantopus mollis* Kunth	11	Vernonieae
Tomoplagia incompleta (Williston, 1896)	*Chrysolaena platensis* (Spreng.) H. Rob.	03	Vernonieae
	Lessingianthus brevifolius (Less.) H. Rob.[b]	01	
Tomoplagia matzenbacheri Prado, Norrbom & Lewinsohn, 2004	*Lessingianthus rubricaulis* (Humb. & Bonpl.) H. Rob.[b]	01	Vernonieae
Tomoplagia reimoseri Hendel, 1914[a]	Chrysolaena platensis[b]	06	Nassauvieae Cass.
	Trixis nobilis (Vell.) Katinas[b]	11	
	Vernonanthura tweediana[b]	291	Vernonieae
Trupanea sp. 1	*Chromolaena hirsuta* (Hook. & Arn.) R. M. King & H. Rob.[b]	02	Eupatorieae
	Chromolaena congesta (Hook. & Arn.) R. M. King & H. Rob.	02	
Trupanea sp. 2	*Conyza primulifolia* (Lam.) Cuatrec. & Lourteig	08	Astereae
	Porophyllum ruderale	02	Tageteae
Trupanea sp. 3	*Conyza primulifolia*	06	Astereae
	Porophyllum ruderale	18	Tageteae
Trupanea sp. 4	*Conyza primulifolia*	02	Astereae
	Porophyllum ruderale	10	Tageteae
Xanthaciura biocellata (Thomson, 1869)	*Barrosoa betonicaeformis* (DC.) R. M. King & H. Rob.	02	Eupatorieae
	Chromolaena congesta	08	
	Grazielia serrata (Spreng.) R. M. King & H. Rob.[b]	02	
Xanthaciura chrysura (Thomson, 1869)	*Artemisia verlotorum* Lamotte[b]	01	Anthemideae Cass.
	Aspilia montevidensis[b]	06	Coreopsideae
	Barrosoa betonicaeformis	16	Eupatorieae
	Bidens subalternans DC.[b]	02	Heliantheae
	Chromolaena hirsuta[b]	04	
	Chromolaena laevigata	47	
	Dimerostemma arnottii (Baker) M. D. Moraes[b]	12	
	Grazielia serrata[b]	12	
	Verbesina sordescens DC.[b]	05	

[a] New record for Rio Grande do Sul.
[b] New host record.

The insects were deposited in the entomological collection of MUZAR.

Results

A total of 102 Asteraceae species were collected, corresponding to 28.5% of the species registered for Rio Grande do Sul (Matzenbacher, 2003). Tephritidae interacted with only 29 out of the 102 species, from which 733 insect specimens emerged, including 313 of *Tomoplagia* Coquillett, 138 of *Dioxyna* Frey, 117 of *Xanthaciura* Hendel, 52 of *Plaumannimyia* Hering, 50 of *Trupanea* Schrank, 22 of *Cecidochares* Bezzi, 12 of *Dictyotrypeta* Hendel, 11 of *Tetreuaresta* Hendel, 10 of *Dyseuaresta* Hendel, and eight of *Euarestoides* Benjamin.

The interactions between Tephritidae species and their host plants (Asteraceae) in Rio Grande do Sul are presented in Table 2.

Discussion

Tagetes erecta is a new host record for *Dioxyna chilensis*. Prado et al. (2002) registered this fly on *Calea graminifolia* Sch. Bip. ex Krasch., *Isostigma* sp., *Porophyllum angustissimum* Gardner, *P. ruderale* and *Senecio oxyphyllus* A. Cunn. ex DC., in the states of Minas Gerais, São Paulo, and Rio Grande do Sul. This species was recorded from *Bidens pilosa* in Santiago, Chile by Prado and Nitsche (1989), and in Santa Catarina, Brazil by Sabedot-Bordin et al. (2011). The occurrence of *D. chilensis* in hosts of the tribe Tageteae in the present study (Table 2) confirms the pattern, since Prado et al. (2002) had already found this fly in Tageteae but also in Neurolaeneae, Senecioneae and Coreopsidae. In the studies of Prado and Nitsche (1989) and Sabedot-Bordin et al. (2011) the only host registered belongs to the tribe Coreopsideae.

Dioxyna peregrina is registered for the first time for Rio Grande do Sul in *Bidens pilosa*, Coreopsideae (Table 2). This species has been reported in Brazil only from *Bidens pilosa* and *Praxelis clematidea* (Griseb.) R. M. King & H. Rob. in Minas Gerais and São Paulo (Prado et al., 2002). Prado et al. (2002) also collected in capitula of Coreopsideae, considering this tribe the main host of *D. peregrina*. However, they also found *D. peregrina* in a species of Eupatorieae, classified as an occasional host.

Plaumannimyia dolores is recorded for the first time for Rio Grande do Sul, and *Baccharis anomala* (Astereae) is recorded for the first time as a host of *P. dolores*. This fly was described based on specimens collected by Fritz Plaumann in Santa Catarina (Hering, 1938a; Norrbom et al., 1999), and its host was not known.

Baccharis megapotamica, *B. spicata* and *B. vulneraria* (Astereae) are new host records for *Plaumannimyia imitatrix*. Prado et al. (2002) recorded *P. imitatrix* from *B. dracunculifolia*, *B. punctulata*, *B. psiadioides* (Less.) Joch. Müll. and *B. trinervis* Pers. in Minas Gerais, São Paulo, Paraná, and Rio Grande do Sul. Sabedot-Bordin et al. (2011) reared *P. imitatrix* from capitula of *Gochnatia polymorpha* in Santa Catarina.

This is the first record of *Plaumannimyia miseta* for Rio Grande do Sul and of *Baccharis helichrysoides*, *Baccharis punctulata* (Astereae) and *G. polymorpha* (Gochnatieae) as hosts for this insect. *Plaumannimyia miseta* had been recorded previously from São Paulo, Paraná, and Santa Catarina (Hering, 1938b; Norrbom et al., 1999).

Baccharis microdonta and *B. spicata* (Astereae) are new host records for *Plaumannimyia pallens*. Prado et al. (2002) reported the occurrence of *P. pallens* in Santa Catarina and Rio Grande do Sul, reared from capitula of *B. dracunculifolia*, *B. punctulata* and *Baccharis uncinella* DC.

The *Plaummanimyia* species were collected in capitula of Astereae and Gochnatieae (Table 2). These results agree with Prado et al. (2002) and Norrbom et al. (2010), who classified Astereae as the main host of species of *Plaumannimyia*. Sabedot-Bordin et al. (2011) collected *P. imitatrix* in Gochnatieae in Santa Catarina. In the present study, *P. imitatrix* and *P. miseta* were collected on Gochnatieae, confirming that species of *Plaumannimyia* may occasionally use plants of the Gochnatieae tribe as hosts.

This is the first record of *Tetreuaresta obscuriventris*, and also of the genus *Tetreuaresta*, for Rio Grande do Sul. *Elephantopus mollis* is the only host known for *T. obscuriventris* (Foote et al., 1993). This fly was introduced in Hawaii and other islands of the Pacific for the biological control of *E. mollis* seeds (Norrbom, 2010; Norrbom and Hancock, 2004). The occurrence of *T. obscuriventris* in Vernonieae (Table 2) confirms what Prado et al. (2002) have found. They recorded five species of *Tetreuaresta* in hosts of this tribe, most of them still not described.

The plant *Lessingianthus brevifolius* (Vernonieae) is a new host for *Tomoplagia incompleta* (Table 2). Prado et al. (2002) recorded plants of the tribe Vernonieae as primary hosts of *T. incompleta*. Sabedot-Bordin et al. (2011) registered the species for *Chrysolaena flexuosa* (Sims) H. Rob. (Vernonieae) plants. Yotoko et al. (2005) considered the species a generalist, since it uses many hosts classified in the tribe Vernonieae, as well as the tribes Eupatorieae and Gochnatieae (Prado et al., 2002).

Tomoplagia matzenbacheri was recorded from capitula of *Lessingianthus rubricaulis* (Vernonieae). The occurence of *T. matzenbacheri* on *L. rubricaulis* is a new record (Table 2). Prado et al. (2004) registered this fly only for the state of Rio Grande do Sul, with *Lessingianthus polyphyllus* (Sch. Bip. ex Baker) H. Rob. (Vernonieae) as its host.

Tomoplagia reimoseri is recorded for the first time for Rio Grande do Sul. *Vernonanthura tweediana*, *Chrysolaena platensis* (Vernonieae) and *Trixis nobilis* (Nassauvieae) are new records of hosts for this species (Table 2). Sabedot et al. (2008) recorded this fly for Santa Catarina from capitula of *Chromolaena pedunculosa* (Hook & Arn.) R. M. King & H. Rob. (Eupatorieae) and *Vernonanthura phosphorica* (Vell.) H. Rob. (Vernonieae). Prado et al. (2002) registered this fly only for the state of Minas Gerais from capitula of eight species of *Vernonanthura* (Vernonieae) as main hosts, as well as the tribes Astereae (one host) and Vernonieae as two occasional hosts. In Brazil, this species is distributed across the states of São Paulo, Minas Gerais, and Santa Catarina (Aczél, 1955a; Prado et al., 2002; Sabedot et al., 2008).

Grazielia serrata (Eupatorieae) is a new host record for *Xanthaciura biocellata* (Table 2). Prado et al. (2002) found *X. biocellata* widely associated with plants of the tribe Eupatorieae.

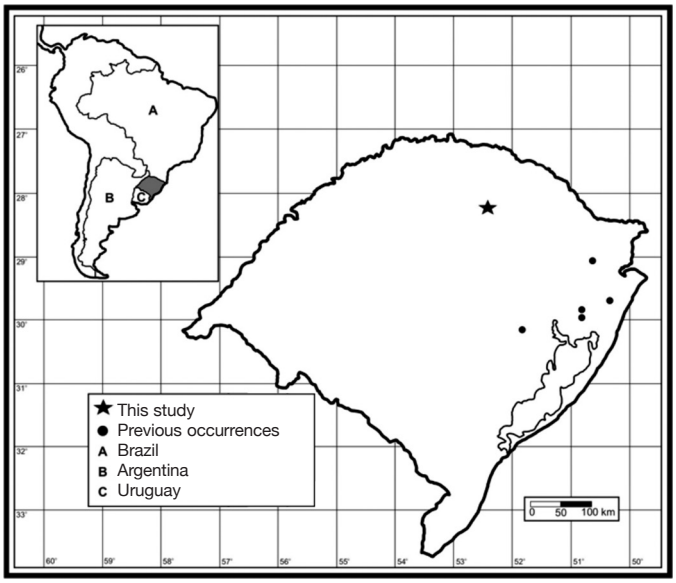

Figure 1. Localities in Rio Grande do Sul, Brazil, where the fauna of Tephritidae (Diptera) from capitula of Asteraceae was sampled.

The following host records for *Xanthaciura chrysura* are new (all in Asteraceae): *Artemisia verlotorum* (Anthemideae), *Bidens subalternans* (Coreopsideae), *Chromolaena hirsuta*, *Grazielia serrata* (Eupatorieae), *Aspilia montevidensis Dimerostemma arnottii* and *Verbesina sordescens* (Heliantheae) (Table 2). Prado et al. (2002) recorded as hosts of *X. chrysura* 51 species of plants from the tribe Eupatorieae, one from the tribe Heliantheae, and one from the tribe Vernonieae. Almeida et al. (2006) observed that *X. chrysura* was the most abundant species on 15 different hosts in eight localities of the state of São Paulo. Of the three most frequent interactions observed in their study, *X. chrysura* occurred in two, with *Chromolaena pedunculosa* and *C. squalida* (Eupatorieae). Eupatorieae and Heliantheae were already registered as hosts of *X. chrysura* in Prado et al. (2002) and Almeida et al. (2006). The species of Anthemideae and Coreopsideae as hosts are new records for the Tephritidae species. Still, hosts of the tribe Coreopsideae are cited for *Xanthaciura connexionis* Benjamin in Central America and United States, and for *Xanthaciura insecta* (Loew) in Brazil, United States, Mexico and Venezuela (Foote et al., 1993; Prado et al., 2002; Wasbauer, 1972).

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Conflicts of interest

The authors declare no conflicts of interest.

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