FIRST RECORD OF *XANTHACIURA* HENDEL (DIPTERA, TEPHRITIDAE) ASSOCIATE WITH FLOWERS OF ARISTOLOCHIACEAE (MAGNOLIOPSIDA, PIPERALES)

PRIMEIRO REGISTRO DE *XANTHACIURA* HENDEL (DIPTERA, TEPHRITIDAE) ASSOCIADAS COM FLORES DE ARISTOLOCHIACEAE (MAGNOLIOPSIDA, PIPERALES)

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Abstract

Xanthaciura (Diptera, Tephritidae) is a Neotropical genus of Tephritinae compose of 17 species. Currently, to Brazil are recorded eight valid species names. The members of the Tephritinae are marked by their interaction with Asteraceae, as females lay eggs in these plants, where the larvae posteriorly feed and develop on various parts of the plant as capitulum, stem, and bud. *Aristolochia* is the largest genus of Aristolochiaceae, currently comprising approximately 525 species widely distributed throughout the tropics. There are 92 registered species in Brazil, widely spread in all ecoregions. Several orders of insects were recorded as floral visitors of *Aristolochia* flowers, as Coleoptera,

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Diptera, Hemiptera, Hymenoptera, and Orthoptera. This study was conducted at the *Reserva Particular do Patrimônio Natural da Universidade Federal de Mato Grosso do Sul* (RPPN/UFMS) Campo Grande, Brazil, where are collected flowers of *Aristolochia esperanze*, content a total of two females of *Xanthaciura chrysura*. The bodies of the sampled dipterans were covered with pollen, which was aggregated on their setae and setulae, suggesting that the species might be a pollinator of *A. esperanzae*. As another result a table with all knows associated plants with *X. chrysura* is presented. This study presents the first record of *X. chrysura* associated with a plant family differently from Asteraceae.

Keywords: Birthwort; Host; Insect-Plant association; Pollination.

Resumo

Xanthaciura (Diptera, Tephritidae) é um gênero Neotropical de Tephritinae composto por 17 espécies. Atualmente, para o Brasil são registrados oito nomes válidos de espécies. Os membros de Tephritinae são caracterizados por sua interação com flores de Asteraceae, na qual as fêmeas depositam ovos nessas plantas para, posteriormente, as larvas alimentarem-se e desenvolverem-se em diferentes partes da planta como nos capítulos, caules e folhas. *Aristolochia* é o maior gênero de Aristolochiaceae, atualmente composto por mais de 525 espécies amplamente distribuídas nos trópicos. Existem registros de 92 espécies para o Brasil, amplamente distribuidas em todas as ecorregiões. Muitas ordens de insetos foram registradas como visitantes florais de *Aristolochia*, como: Coleoptera, Diptera, Hemiptera, Hymenoptera e Orthoptera. Este estudo foi realizado na *Reserva Particular do Patrimônio Natural da Universidade Federal de Mato Grosso do Sul* (RPPN/UFMS) Campo Grande, Brasil, onde foram coletadas flores de *Aristolochia esperanze*, contendo um total de duas fêmeas de *Xanthaciura chrysura*. Os corpos dos dípteros coletados estavam revestidos por pólen, os quais estavam agregados em suas cerdas e pelos, sugerindo que essa espécie possa ser um polinizar de *A. esperanze*. Como outro resultado uma tabela com todos os registros de associação de plantas com *X. chrysura é apresentada*. Este estudo apresenta o primeiro registro de *X. chrysura* associada com uma família de plantas diferentemente de Asteraceae.

Palavras-chave: Cipó-mil-homens; Planta hospedeiro; Interação inseto-planta; Polinização.

INTRODUCTION

Tephritidae (Diptera, Schizophora) comprises more than 4,700 species, disposed in 481 genera (Roskoy et al. 2018). Usually called fruit flies, the biology of the family is well known, and most of the species are phytophagous, except for Tachiniscinae, which are parasitoids (Norrbom 2010). The members of the subfamily Tephritinae are marked by their interaction with Asteraceae, as females lay eggs in the plant, where

the larvae posteriorly feed and develop on various parts of the plant as capitulum, stem, and bud (Prado et al. 2002; Norrbom 2010).

The genus *Xanthaciura* Hendel, 1914 is a Neotropical genus currently composed of 17 species (Norrbon 2010). There are eight species recorded in Brazil: *X. biocellata* (Thomson, 1869); *X. chrysura* (Thomson, 1869); *X. insecta* (Loew, 1862); *X. mallochi* Aczél, 1949; *X. phoenicura* (Loew, 1873); *X. quadrisetosa* (Hendel, 1914); *X. tetraspina* (Phillips, 1923); and *X. unipuncta* Malloch, 1933 (Uchoa 2018).

The flies of this genus can be recognized by the following combination of characters: frons narrow, bare; three pairs of lower fronto orbital setae and one pair of upper setae; scutum shiny, usually black; one or two pairs of dorsocentral setae; notopleura concolorous dark; two anepisternal seta; one pair of scutellar setae; wing hyaline, with remarkable antlike pattern of brownish to black (Fig. 1) (Foote 1980).

Figure 1 a–d: *Xanthacyura chrysura*. 1.a: Habitus, lateral view; 1.b: Habitus, dorsal view; 1.c: wing; 1.d: Abdomen. Scales: 1.a–1.c: 0.5mm; 1.d: 0.2mm

Xanthaciura chrysura can be segregated from its congeners by body length 2–3 mm; wings longer than body, with three hyaline dots, between R_{4+5} and M; halter dark brown to blackish brown, long, wide and flattened; ovipositor nearly as long as wide at the base; legs yellow with a brown to blackish brown band on the apex of the middle and hind femora (Aczél 1949, 1952).

Aristolochia is the largest genus of Aristolochiaceae, currently comprising 525 species widely distributed throughout the tropics, subtropics and temperate regions

(Do et al. 2015; IPNI 2021). There are 92 registered species in Brazil, widely spread in all ecoregions (Barros et al. 2015). The pollination strategy of *Aristolochia* occurs in the following two steps: first, the pollinator is attracted by the strong odor of the flower and gets caught inside the utricle, where pollen adheres to its body; second, the insect is released with the pollen load and visits other flowers, ensuring pollination (Sakai 2002).

Several orders of Insecta were recorded as floral visitors of *Aristolochia*, as Coleoptera, Diptera, Hemiptera, Hymenoptera, and Orthoptera (Valdivia et al. 2007). Burgess et al. (2004) pointed out that Phoridae and Staphylinidae, Diptera and Coleoptera respectively, were the most common visitors of *Aristolochia grandiflora* Sw. At least 39 families of Diptera were recorded in *Aristolochia*, but only some groups are known to carry pollen loads and act as pollinators. The only record of Tephritidae visiting Aristolochiaceae flowers is from one unidentified species associated with *Aristolochia ridicula* N.E. Brown (Berjano et al. 2008).

Aristolochia esperanzae Kuntze has a distribution restricted to the Neotropical region, with occurrence in Argentina (Chaco, Formosa, Jujuy, Salta), Paraguay (Alto Paraguay, Concepcion), Bolivia (La Paz, Santa Cruz, Tarija), and Brazil (Distrito Federal, Goias, Mato Grosso, Mato Grosso do Sul, Minas Gerais, São Paulo) (Fig. 2a). Dipterans, as Chloropidae, Drosophilidae and Phoridae, were recorded visiting this species, however none of these flies presented pollen covering their bodies (Berjano et al. 2008).

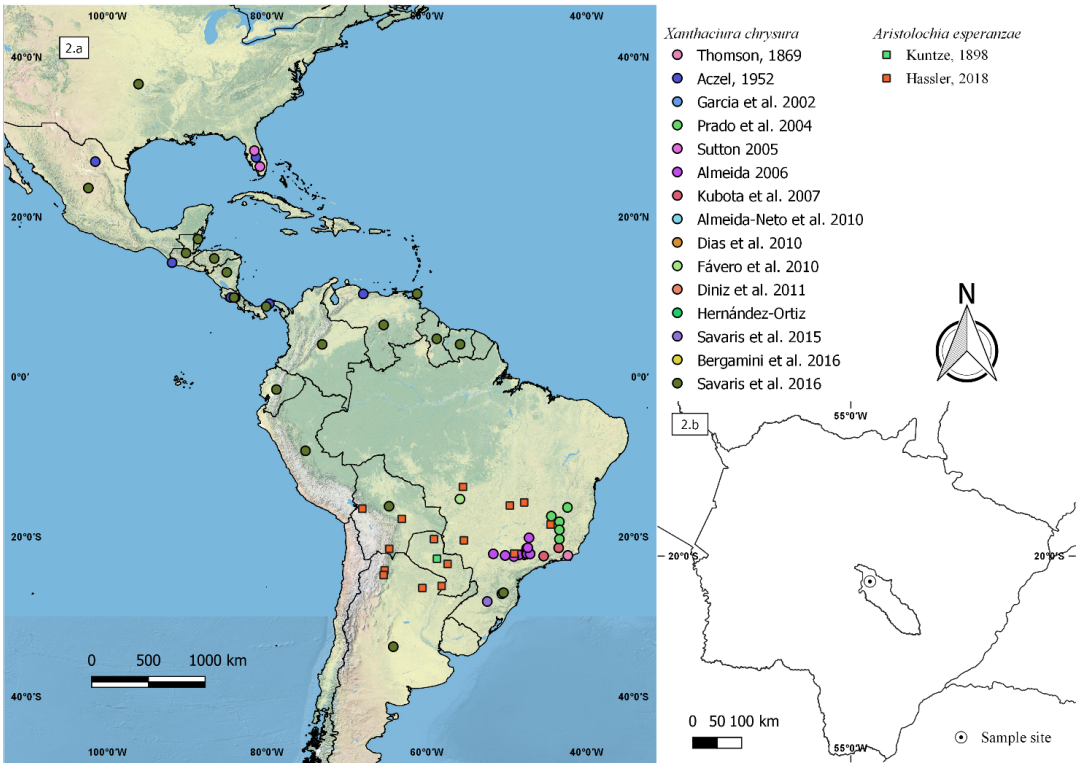

Figure 2a–b: Map of South America. 2.a: Distribution of Aristolochia esperanzae and *Xanthaciura chrysura*. 2.b: Mato Grosso do Sul and Campo Grande, sample site.

MATERIAL AND METHODS

This study was conducted at the *Reserva Particular do Patrimônio Natural da Universidade Federal de Mato Grosso do Sul* (RPPN/UFMS) (20S 30' 54W 36"), an urban fragment of Cerrado (Brazilian Savanna) located in the municipality of Campo Grande, Brazil (Fig. 2.b). The samples were collected on June 3, 2014.

The collected flowers were placed in plastic bags for transportation to the *Laboratório de Sistemática de Diptera* (LSD/UFMS). The flowers remained in the freezer for five minutes and were placed in vials containing 70% ethanol. The flowers were opened in a longitudinal section to remove the insects. The specimes of *X. chrysura* was determined using the key proposed by Aczél (1952). The material was deposited in the *Coleção Zoológica da Universidade Federal de Mato Grosso do Sul* (ZUFMS), Campo Grande, Brazil under the voucher numbers: ZUFMS-DIP00020 and ZUFMS-DIP00021

RESULTS AND DISCUSSION

The samples resulted in four flowers of *A. esperanze* (Fig. 3) and two females of *X. chrysura* (Fig. 1a–d). The distribution of *Xanthaciura chrysura* is presented in Fig. 2. However, the distribution of the species is concentrated to the Southeastern of Brazil, it is estimated that their distribution occurs throughout the entire Neotropical region until the limits in southern Florida (Sutton and Steck, 2005). The Table 1 presents the know records plants associated with *X. chrysura*, where all previous records are exclusive to the Asteraceae from the tribes Heliantheae, Eupatorieae, Anthemideae, Coreopsideae, and Lychnophorinae. This study presents the first record of *X. chrysura* associated with a plant family differently from Asteraceae.

Figure 3: *Aristolochia esperanzae*, flower. Lateral view.

Table 1: Know records of plants associated with *Xanthaciura chrysura*

Family	Tribe	species	References
Aristolochiaceae		*Aristolochia esperanze* K	New record
Asteraceae	Lychnophorinae	*Eremanthus*aff. *Glomerulatus* Less.	Prado et al. 2004
=	--	--	Diniz et al. 2011
=	--	--	Kubota et al. 2007
=	Eupatorieae	*Chromolaena squalida* (DC.) R.M. King and H. Rob.	Dias et al. 2010
=	Eupatorieae	*Chromolaena odorata* (DC.) R.M. King and H. Rob.	Almeida-Neto et al. 2010
=	--	--	Fávero et al 2010
=	--	--	Nobre et al. 2015
=	Eupatorieae	--	Prado et al. 2002
=	Heliantheae	--	=
=	Anthemideae	*Artemisia verlotorum* Lamotte	Savaris et al. 2015
=	Coreopsideae	*Aspilia montevidensis* (Spreng.) Kuntze	=
=	Eupatorieae	*Barrosoa betonicaeformis* (DC.) R.M. King and H. Rob.	=
=	Heliantheae	*Bidens subalternans* (DC.) R.M. King and H. Rob.	=
=	Eupatorieae	*Chromolaena hirsuta* (Hook. And Arn.) R.M. King H. Rob.	=
=	Eupatorieae	*Chromolaena laevigata* (Lam.) R.M. King and H. Rob.	=
=	Heliantheae	*Dimerostemma arnottii* (Baker) M.D. Moraes	=
=	Eupatorieae	*Grazielia serrata* (Spreng.) R.M. King and H. Rob.	=
=	Heliantheae	*Verbesina sordescens* DC.	=

-- Non Informed

= Same as above

CONCLUSION

The previously known plants association of *X. chrysura* belongs to Asteraceae. The bodies of the sampled specimens were covered in pollen, which was aggregated on their setae and setulae suggesting that the species might be, at least, an occasional pollinator of *A. esperanzae*.

ACKNOWLEDGEMENT

This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001.

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