

**New records of *Forcipomyia (Pterobosca) incubans* Macfie (1937)
(Diptera: Ceratopogonidae) parasitizing wings of Odonata in Brazil**

**Novos registros de *Forcipomyia (Pterobosca) incubans* Macfie (1937)
(Diptera: Ceratopogonidae) parasita de asas de Odonata no Brasil**

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ABSTRACT

This report presents the first record of *Forcipomyia (Pterobosca) incubans* Macfie (1937) (Diptera: Ceratopogonidae) in the states of Amapá and Pará, located in the North Region, and in Rio Grande do Sul and Santa Catarina, in the South Region of Brazil. Besides seven new records of species of Odonata parasitized in Latin America. Females of *F. (P.) incubans* were collected in the wings of 47 specimens of dragonflies. The species *Homeoura chelifera* Selys, 1876 and *Telebasis willinki* Fraser, 1948 family Coenagrionidae, *Remartinia luteipennis* (Burmeister, 1839) family Aeshnidae, *Erythemis peruviana* (Rambur, 1842), *Erythemis vesiculosa* (F. 1775), *Erythrodiplax fusca* (Rambur, 1842), *Erythrodiplax umbrata* (L. 1758), *Miathyria marcella* (Selys in Sagra, 1857), *Orthemis concolor* Ris, 1919 and *Orthemis nodiplaga* Karsch, 1891 representatives from family Libellulidae comprise the new records for the Brazil, thus increasing to 13 the number of species with parasitism *F. (P.) incubans* in the country.

Key words: Diversity, Latin America, parasitism, insects.

RESUMO

O presente trabalho apresenta o primeiro registro de *Forcipomyia (Pterobosca) incubans* Macfie (1937) (Diptera: Ceratopogonidae) para os estados do Amapá e Pará, situados na região norte do Brasil, e Rio Grande do Sul e Santa Catarina localizados na Sul do país. Assim como sete novos registros de espécies de Odonata parasitadas na América latina. Fêmeas de *F. (P.) incubans* foram coletadas em asas de 47 indivíduos de libélulas. *Homeoura chelifera* Selys, 1876 e *Telebasis willinki* Fraser, 1948 pertencentes a família Coenagrionidae, *Remartinia luteipennis* (Burmeister, 1839) da família Aeshnidae, *Erythemis peruviana* (Rambur, 1842), *Erythemis vesiculosa* (F. 1775), *Erythrodiplax fusca* (Rambur, 1842), *Erythrodiplax umbrata* (L. 1758), *Miathyria marcella* (Selys in Sagra, 1857), *Orthemis concolor* Ris, 1919 e *Orthemis nodiplaga* Karsch, 1891 compreendem os novos registros para país, aumentando para 13 o número de espécies parasitadas por *F. (P.) incubans* no Brasil.

Palavras-chave: Diversidade, América Latina, parasitismos, insetos.

1 INTRODUCTION

Ceratopogonidae are small-sized Diptera Nematocera, the adult females feed by hematophagy of vertebrates and invertebrates. During its larval stage, Ceratopogonidae species can be carnivore, detritivore, omnivore, or feed on phytoplankton (MCCAFFERTY, 1981). The genus *Forcipomyia* Meigen (1818) is one of the most diverse in the family Ceratopogonidae, concerning more than 1.060 species, distributed in 30 subgenus, present and extinct (BORKENT & WIRTH 1997; BORKENT, 2015). In tropical and subtropical regions, *Forcipomyia* species play a major role in the pollination of plants of commercial importance, such as cocoa (CHAPMAN & SORIA, 1983).

In Brazil, the subgenus *Pterobosca* Macfie (1932) shows records of two species *Forcipomyia (Pterobosca) fusicornis* (Coquillett, 1905) in the state of Rio de Janeiro, and *Forcipomyia (Pterobosca) incubans* Macfie (1937), only recorded so far in the state of

Minas Gerais (SANTAREM & FELIPPE-BAUER, 2017). Worldwide, 23 species of this subgenus are recorded. *F. (P.) incubans* species was described by Macfie (1937) based on specimens collected in the wings of *Argia ulmeca* Calvert, 1902 (Odonata: Coenagrionidae).

In some *Pterobosca* species the females are parasites of bugs, in Odonata they are usually found attached to the wings of the host sucking the hemolymph from the veins (WILDERMUTH & MARTENS, 2007). Only in Europe *Forcipomyia (Pterobosca) paludis* (Macfie, 1936) has been recorded parasitizing more species of Odonata (MARTENS et al. 2008, 2012).

In America (Central and South) there have been so far 21 records of parasitism in Odonata species by *F. (P.) incubans*, & Huerta (2006) presents a list of 18 Odonata parasitized species in his study, Guillermo-Ferreira & Vilela (2013) had the same record of *F. (P.) incubans* for Brazil, by collecting three species of parasitized dragonflies in the state of Minas Gerais. In this report we show new records of parasitism *F. (P.) incubans* in Odonata species, besides the first record of the species in four states in Brazil, Amapá and Pará, inserted in the Amazonian biome in the North Region, Rio Grande do Sul and Santa Catarina, the two most southern states in the country. Widening the area of occurrence of the parasite inside the country, as well as the number of Odonata parasitized species.

2 MATERIALS AND METHODS

2.1 SAMPLING

Specimen of Odonata parasitized by *F. (P.) incubans* were collected with the help of an entomological net between 09:00 and 16:00. The identification of the specimens was performed with the help of the taxonomic keys proposed by Lencioni (2005, 2006) and Heckman (2006, 2008).

In the South of Brazil, the sampling of specimens of dragonflies took place in November 2014 and October 2015. In the state of Rio Grande do Sul there were collections in the counties of Capão do Leão, at Campus Capão do Leão (31°48'01.3"S 52°24'40.7"W) at Universidade Federal de Pelotas– UFPel, and in Rio Grande at Estação Ecológica do Taim (32°32'21.6"S 52°32'23.8"W). In Santa Catarina, the Odonata species were collected in Ilha de Florianópolis (27°23'33.4"S 48°25'53.8"W).

The collection of Odonata in the Amazonian area, were carried out during 2018. The parasitized individuals were captured in the state of Amapá, in the county of Macapá

(0°00'19.9"S 51°05'08.9"W) in an area of dry forest, located at Marco zero campus at Universidade Federal do Amapá, in the state of Pará, the collections were carried out in the county of Gurupá (0°24'45.6"S 51°14'08.3"W).

3 RESULTED AND DISCUSSION

We collected 463 odonatas; 47 specimens, distributed in 10 species and three families were parasitized by *F. (P.) incubans*. Seven of the species found in this study are new records of parasitism for Latin America, and the 10 species identified during the research are indicated as parasites for the time in Brazil Table 1. Among the 24 Odonata species with record of parasitism by *F. (P.) incubans* in Latin America, 22 happened in Brazil. The new records of parasitism for Latin America concern the species *Homeoura chelifera* (Selys, 1876) and *Telebasis willinki* Fraser, 1948 representatives of the family Coenagrionidae, *Remartinia luteipennis* (Burmeister, 1839) family Aeshnidae, *Erythrodiplax fusca* (Rambur, 1842) and *Orthemis nodiplaga* Karsch, 1891 family Libellulidae captured in Rio Grande do Sul. Two parasitized representatives of the family Libellulidae were found in more than one Brazilian state, *Erythemis peruviana* (Rambur 1842) was shown in the states of Amapá and Rio Grande do Sul, *Orthemis concolor* Ris, 1919 had specimens captured in the states of Amapá and Pará.

Among those new records for Latin America, only the species *H. chelifera* (Selys, 1876), *T. willinki* Fraser, 1948, *O. concolor* Ris, 1919 *O. nodiplaga* Karsch, 1891 are limited to South America. *R. luteipennis* (Burmeister, 1839), *E. peruviana* (Rambur 1842) and *E. fusca* (Rambur, 1842) are species widely distributed, from North America to South America; these data suggest that *F. (P.) incubans* can be associated with these species in all Americas. Still, for not showing host specificity *F. (P.) incubans* should concern a high number of Odonata species as host.

CONFLICT OF INTEREST STATEMENT

We declare that we have no conflict of interest

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Table 1. Odonata species collected and the registration states: Amapá (AP), Pará (PA), Rio Grande do Sul (RS) and Santa Catarina (SC). * New registration of parasitism for Latin America, # New registration of parasitism for Brazil.

Subord / Family	Species	Brazilian State where it was collected, number of individuals
Zygoptera		
Coenagrionidae	<i>Homeoura chelifera</i> (Selys, 1876)*#	RS(1)
	<i>Telebasis willinki</i> Fraser, 1948*#	RS(1)
Anisoptera		
Aeshnidae	<i>Remartinia luteipennis</i> (Burmeister, 1839)*#	RS(3)
Libellulidae	<i>Erythemis peruviana</i> (Rambur, 1842)*#	AP(2), RS(4)
	<i>Erythemis vesiculosa</i> (Fabricius, 1775)#	RS(3), SC(1), AP(1)
	<i>Erythrodiplax fusca</i> (Rambur, 1842)*#	RS(4)
	<i>Erythrodiplax umbrata</i> (Linnaeus, 1758)#	AP(1), PA(3)
	<i>Miathyria marcella</i> (Selys in Sagra, 1857)#	AP(2), SC(1), RS(9)
	<i>Orthemis concolor</i> Ris, 1919*#	AP(3), PA(2)
	<i>Orthemis nodiplaga</i> Karsch, 1891*#	RS(6)