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ARTICLE

Wing feather mites (Acari: Astigmata) on some Passeriformes (Aves) from state of Paraná, Brazil

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ABSTRACT: Feather mites are the most abundant arthropods found on birds, however, few studies have investigated their ecological associations with their hosts in Brazil. Here, we present a checklist of feather mites on 11 bird species from forest patches of Paraná State, Brazil. We recovered 16 species of feather mites belonging to two astigmatan families, namely Proctophyllodidae and Trouessartiidae. No visible external injuries were observed in the birds which could be related to the presence of these mites on their feathers. We report for first time five feather mite species from Paraná State. The present checklist expands the geographical range for five mite species, with one recorded for the first time in Brazil. Moreover, we have collected two potential new species of the genera *Amerodectes* and *Trouessartia* and recorded new bird hosts for three mite species.

KEY-WORDS: Astigmata, bird-mite interactions, checklist, Proctophyllodidae, Trouessartiidae.

INTRODUCTION

Feather mites (Astigmata: Analgoidea and Pterolichoidea) are the most diverse and abundant arthropods associated with birds (Gaud & Atyeo 1996, Proctor 2003). Although usually regarded as ectoparasites, most feather mites living on the plumage apparently do not cause visible damage to their hosts. According to Proctor & Owens (2000), feather mites feed on uropygial oil, but occasionally can ingest pollen, fungal spores and other particles attached to the feathers, and some species also feed on skin scales.

About 2,400 feather mite species are presently recognized, but the extant number of these animals may potentially reach 18,000 according to some estimates (Gaud & Atyeo 1996; Mironov 2003). In recent years, there have been increasing efforts aimed at investigating and describing feather mites and their distribution in Brazil. Most notable among these studies are works containing redescriptions or descriptions of new taxa (Hernandes & Valim 2005, 2006, 2014, Valim & Hernandes 2006, 2008, Hernandes 2012, 2013, 2014a, b, Mironov & Hernandes 2014) and checklists of feather mites of Cerrado (Rojas 1998, Kanegae *et al.* 2008) and the Atlantic Rain Forest (Carvalho & Serra-Freire 2001, Lyra-Neves *et al.* 2003). Valim *et al.* (2011) summarized and reviewed the literature on feather mites described/registered from Brazilian birds. According to those authors, 185 nominal species of feather mites belonging to 21 families were reported in Brazil on 15 bird orders. Among the species, only mites from the families Proctophyllodidae, Crypturoptidae and Pterolichidae had more than 10 species reported on Brazilian birds and the most species were recorded on the order Passeriformes (Valim *et al.* 2011).

The Neotropical region presents the greatest avifaunal diversity (García-Moreno *et al.* 2007) and consequently has a great potential to harbor a high richness of feather mite taxa. At the same time most bird species of this region have their mite fauna still unknown. In this paper, we report feather mite species found on some birds from several patches of Atlantic forest in Paraná State, Brazil.

METHODS

The bird communities were sampled at seven patches of the Atlantic forest in the municipalities of Fênix and São Pedro do Ivaí, Paraná State, Brazil (Figure 1) from July 2002 until June 2003, and from March 2006 until December 2006. The sampling was developed with ten mist nets set in line configuration in each forest patch,

and totaling 300 m² of capture area. All bird specimens captured had their wings visually analyzed in the field and the most infested remige feather was removed and stored in individual vials containing 70% ethanol. The birds were banded and released after examination (Cemave Permit Number 1234). Bird scientific names follow CBRO (2014).

Mites were cleared in 30% lactic acid for 12-24 hours at 50 degrees Celsius and mounted in Hoyer's medium (Krantz & Walter 2009). Identifications were based on the keys to supraspecific taxa presented by Gaud & Atyeo (1996) and following the recent literature on specific taxa (e.g. Valim & Hernandes 2010, Hernandes 2014a, Hernandes & Valim 2014).

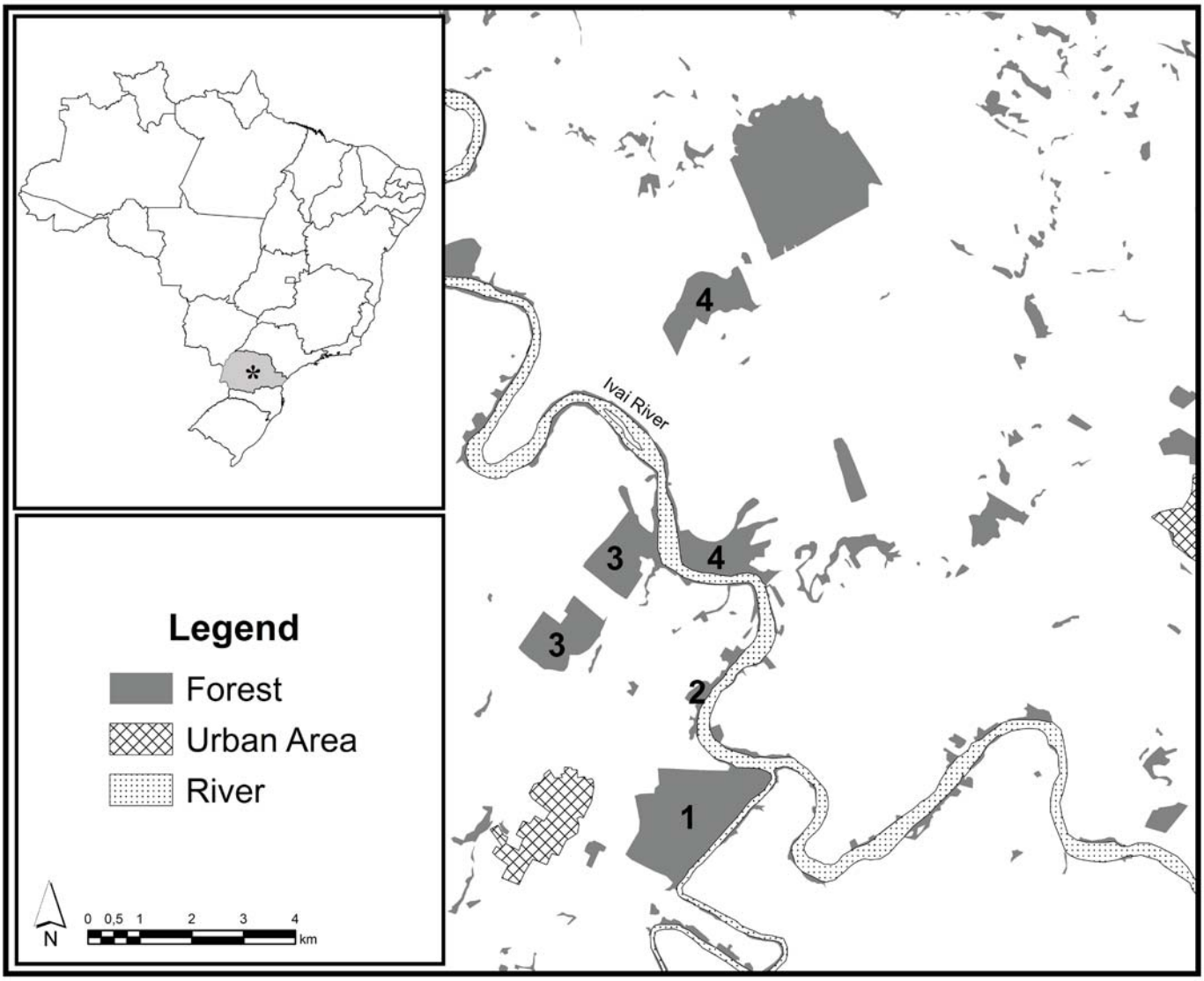

FIGURE 1. Sampling sites at several municipalities in the State of Paraná. Fênix: (1) Vila Rica Espírito Santo State Park (23S 54' 48"/51W 57' 07"); (2) Guajuvira Farm (23S 53' 44"/51W 57' 09"); (3) Cagibi Farm (23S 52' 41"/51W 58' 18"). São Pedro do Ivaí: (4) Santa Vitória Farm (23S 52' 17"/51W 56' 59").

RESULTS AND DISCUSSION

We sampled 11 bird species belonging to nine families (Table 1). Among those, *Pipra fasciicauda* Hellmayr, 1906 was the most abundant followed by *Turdus leucomelas* Vieillot, 1818, *Automolus leucophthalmus* (Wied-Neuwied, 1821) and *Leptopogon amaurocephalus* Tschudi, 1846. Other bird species with few individuals sampled were *Turdus albicollis* Vieillot, 1818, *Capsiempis flaveola* (Lichtenstein, 1823), *Basileuterus culicivorus* (Deppe, 1830), *Habia rubica* (Vieillot, 1817), *Lanio melanops* (Vieillot, 1818), *Tachyphonus coronatus* (Vieillot, 1822), and *Dysithamnus mentalis* (Temminck, 1823) (Table 1).

In 2002, 209 birds were captured, with 34 of them harboring feather mites, whereas in 2006 we captured 139 birds with 57 of them harboring feather mites (Table 2).

We collected feather mites of 16 species and two families (Table 1). All recovered species of the family Trouessartiidae belong the genus *Trouessartia*, whereas the family Proctophyllodidae was represented by mites of five genera: *Amerodectes*, *Atrichophyllodes*, *Lamellodectes*, *Proctophyllodes*, and *Tyrannidectes*. Undetermined species

TABLE 1. Feather mites sampled on bird species during this study at several localities in the State of Paraná, Brazil.

bird family	bird species	mite species	locality*
Pipridae	*Pipra fascicauda*	*Nycteridocaulus* sp. 1	Fênix/1 and 3
Turdidae	*Turdus leucomelas*	*Amerodectes turdinus*	Fênix/1
	"	*Trouessartia serrana*	Fênix/2
	"	*Tyrannidectes fissuratus*	Fênix/1
	Turdus albicollis	*Amerodectes turdinus*	Fênix/3
	"	*Proctophyllodes weigoldi*	Fênix/3
Furnariidae	*Automolus leucophtalmus*	*Lamellodectes ocelatus*	Fênix/1 and 3
Tyrannidae	*Leptopogon amaurocephalus*	*Nycteridocaulus* aff. *tyranni*	Fênix/2
	Capsiemps flaveola	*Nycteridocaulus* aff. *tyranni*	São Pedro do Ivaí/4
Parulidae	*Basileuterus culicivorus*	*Amerodectes* sp. 1	Fênix/2
	"	*Trouessartia basileuteri*	Fênix/2
	"	*Nycteridocaulus* sp. 2	São Pedro do Ivaí/4
Thraupidae	*Habia rubica*	*Proctophyllodes habiae*	São Pedro do Ivaí/4
	"	*Trouessartia* sp. 1	São Pedro do Ivaí/4
	"	*Nycteridocaulus* sp. 3	Fênix/1
	Lanio melanops	*Trouessartia* sp. 2	Fênix/2
	Tachyphonus coronatus	*Amerodectes* sp. 2	São Pedro do Ivaí/4
Thamnophilidae	*Dysithamnus mentalis*	*Atrichophyllodes mentalis*	Fênix/2

*(1) Vila Rica Espírito Santo State Park; (2) Guajuvira Farm; (3) Cagibi Farm; (4) Santa Vitória Farm (see figure 1 for details).

TABLE 2. Total number of individuals of each bird species and number of birds infested by mites captured during this study at several localities in the State of Paraná, Brazil.

Birds species	SAMPLED		INFESTED	
	2002	2006	2002	2006
Pipra fascicauda	109	83	9	33
Turdus leucomelas	44	7	11	2
Turdus albicollis	11	3	4	1
Automolus leucophtalmus	16	8	1	4
Leptopogon amaurocephalus	14	9	4	1
Capsiemps flaveola	0	1	0	1
Basileuterus culicivorus	9	3	4	3
Habia rubica	0	13	0	7
Lanio melanops	3	5	0	2
Tachyphonus coronatus	1	1	1	0
Dysithamnus mentalis	2	6	0	3
TOTAL	209	139	34	57

of the genus *Nycteridocaulus* were recorded on three hosts. *Amerodectes turdinus* (Berla, 1959) and *Nycteridocaulus* aff. *tyranni* were recorded on two hosts whereas the remaining mite species were each collected only on one host species (Table 1): *Amerodectes* sp. 1, *Amerodectes* sp. 2, *Atrichophyllodes mentalis* Hernandes, Valim & Mironov, 2007, *Lamellodectes ocelatus* (Berla, 1960), *Proctophyllodes weigoldi* Vitzthum, 1922, *P. habiae* Atyeo & Braasch, 1966, *Trouessartia basileuteri* Hernandes, 2014, *Trouessartia serrana* Berla, 1959, *Trouessartia* sp 1., *Trouessartia* sp. 2. and *Tyrannidectes fissuratus* (Hernandes & Valim, 2005) (Table 1).

The *Trouessartia* species were collected on the dorsal surface of primary, secondary and tertiary remiges, whereas proctophyllodid mites were sampled on the ventral surface of remiges. This surface preference of wing feathers was already observed by previous authors (Santana 1976, Mironov & González-Acuña 2013, Hernandes 2014a).

We recorded five wing mite species sampled for the first time in the State of Paraná, namely, *A. turdinus*, *T.*

serrana, *L. ocelatus*, *T. basileuteri* and *P. habiae*. Moreover, the species *P. habiae,* found on *Habia rubica,* is a new record for Brazil. Previous authors recorded this mite species on *H. rubica* in Honduras and Mexico (Atyeo & Braasch 1966).

In the present paper we also recorded new hosts for three mites; *A. turdinus* and *T. serrana* on feathers of *Turdus leucomelas* and *P. weigoldi* on *Turdus albicollis*. *Amerodectes turdinus* has been previously reported on *Turdus rufiventris* Vieillot, 1818 and *Turdus albicollis* (Turdidae), whereas *T. serrana* was known only from *T. albicollis* (Valim *et al.* 2011), both collected on birds from Rio de Janeiro State, Brazil. *Proctophyllodes welgoldi* has been previously observed on *Turdus obscurus* Gmelin, 1789 from Malaysia and on *Turdus rufiventris* and *Turdus amaurochalinus* Cabanis, 1850 from Brazil (Amaral *et al.* 2012, Atyeo & Braasch 1966).

We sampled at least two potential new species of mites from the genera *Amerodectes*, on *Capsiemps flaveola*, and *Trouessartia* on *Habia rubica*. Both species need future taxonomic evaluation and description.

Here, we expanded the geographical range for five mite species and recorded one of them for the first time in Brazil. Moreover, we recorded a new host species for three feather mites. These results contribute to reduce the lack in knowledge about the biodiversity of these poorly known micro-arthropods inhabiting bird feathers.

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