

## RESEARCH NOTE / NOTA CIENTÍFICA

### THE FIRST RECORD OF MITES OF THE GENUS *NEHARPYRHYNCHUS* (ACARIFORMES: HARPIRHYNCHIDAE) FROM BIRDS IN PARAGUAY

### PRIMEROS REGISTROS DE ACAROS DEL GENERO *NEHARPYRHYNCHUS* (ACARIFORMES: HARPIRHYNCHIDAE) EN AVES DEL PARAGUAY

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#### Abstract

Three mite species of the genus *Neharpyrhynchus* (Acariformes: Harpirhynchidae) were recorded on wild birds represented by new hosts in Paraguay: *Neharpyrhynchus trochilinus* ex *Chlorostilbon lucidus* (= *aureoventris*) (Apodiformes: Trochilidae), *Neharpyrhynchus tangara* ex *Paroaria capitata* and *P. coronata* (Passeriformes: Thraupidae), and *Neharpyrhynchus* aff. *spinus* ex *Setophaga* (= *Parula*) *pitiayumi* (Passeriformes: Parulidae). Records from *C. aureoventris*, *P. capitata*, *P. coronata* and *P. pitiayumi* represent new host-parasite associations. Mites of this genus were recorded in Paraguay for the first time.

**Keywords:** Birds - *Chlorostilbon* - ectoparasites - mites - *Neharpyrhynchus* - *Parula* - *Paroaria* - *Setophaga*.

#### Resumen

Dos especies de ácaros del género *Neharpyrhynchus* (Acariformes: Harpirhynchidae) fueron registrados en aves silvestres del Paraguay: *Neharpyrhynchus trochilinus* ex *Chlorostilbon lucidus* (= *aureoventris*) (Apodiformes: Trochilidae), *Neharpyrhynchus tangara* ex *Paroaria capitata* y *P. coronata* (Passeriformes: Thraupidae) y *Neharpyrhynchus* aff. *spinus* ex *Setophaga* = *Parula*) *pitiayumi* (Passeriformes: Parulidae). Los registros en *C. aureoventris*, *P. capitata*, *P. coronata* y *P. pitiayumi* representan nuevas asociaciones huésped - parásito. Los ácaros de este género fueron reportados por primera vez para el Paraguay.

**Palabras clave:** Acaros – aves – *Chlorostilbon* – ectoparasitos – *Neharpyrhynchus* – *Parula* – *Paroaria* – *Setophaga*.

## INTRODUCTION

Mites of the family Harpirhynchidae (Acariformes: Cheyletoidea) are permanent mono- or oligoxenous parasites of birds and snakes of the superfamily Colubroidea (mites of the subfamily Ophioptinae). The harpirhynchid genus *Neharpyrhynchus* Fain (Acariformes: Harpirhynchidae) includes 14 species (Skoracki *et al.*, 2012; Bochkov and O Connor, 2013). Among them four species are known from Neotropical passerines (Bochkov *et al.*, 2007; Bochkov & Literak, 2011; Literak *et al.*, 2012). Until now there were no data on their occurrence on birds in Paraguay. In this contribution we provide new host and locality records for three *Neharpyrhynchus* spp. collected on wild birds in Paraguay.

## MATERIAL AND METHODS

Ornithological mist nets were used to trap wild birds in Paraguay during the 2012 South American winter. Birds trapped were subjected to naked eye examination for the presence of harpirhynchid mites which are usually localized at the base of feathers on head (Martinu *et al.*, 2008; Bochkov & Literak, 2011). Mites were removed using a tweezer and preserved in 96 % ethyl alcohol. After examination, all the birds were released back into the wild as quickly as possible to minimize disturbance. In total, 480 birds belonging to 106 species were examined (Table 1). Three study locations were as follow: San Rafael National Park, Kanguery Biological Station, 26°30'S, 55°47'W, 183 masl, a location in the region of the Paraguayan Atlantic Forest (from 17 to 24 August); Teniente Agripino Enciso National Park, Headquarters Area, 21°12'S, 61°39'W, 253 masl, in the Paraguayan Chaco, a semi-arid region with a very low human population density (from 30 August to 4 September); and Los Tres Gigantes Biological Station, 20°04'S, 50°09'W, 82 masl, in the Paraguayan Pantanal (from 6 to 10 September). Each individual bird was identified using Narosky and Yzurieta (2006) and Gwynne *et al.* (2010). The field study was permitted with SEAM (Secretaria del Ambiente) Paraguay (No.

118859, No. 121842, No. 121856). Mites were mounted in Hoyer's medium and studied using a Leica microscope under Nomarsky interference-contrast-phase (DIC) optics. The scientific names of birds follow the checklist of Clements *et al.* (2013). Voucher specimens were deposited in collections in the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia (ZISP).

## RESULTS AND DISCUSSION

*Neharpyrhynchus trochilinus* (Fain, 1972)

Material examined. 10 females (ZISP AVB 2013-1219-001, 1-10) from *Chlorostilbon lucidus* (= *aureoventris*) (Shaw, 1812) (Apodiformes: Trochilidae) [new host, new location], PARAGUAY: Teniente Agripino Enciso National Park, Headquarters Area (21°12'S, 61°39'W), 1 September 2012, coll. I. Literak (field number PG272).

Prevalence. *N. trochilinus* was recorded on one of the two specimens of *C. lucidus* examined.

This species was described from an undetermined hummingbird originated from South America and died in the Antwerp Zoo, Belgium (Fain, 1972). Later, *N. trochilinus* was recorded on other South American hummingbird *Chrysolampis mosquitos* (Linnaeus, 1758) which also died in the Antwerp Zoo (Fain, 1995). Recently *N. trochilinus* has been reported on *Amazilia lactea* (Lesson, 1929) from Brazil, *Panterpe insignis* Cabanis and Heine, 1860 and *Eugenes fulgens* (Swainson, 1827), both from Costa Rica, and *A. lactea* and *A. chionogaster* (Tschudi, 1846) from Peru (Bochkov & Literak, 2011; Literak *et al.*, 2012).

*Neharpyrhynchus tangara* Bochkov and Literak, 2011

Material examined. Seven females (ZISP AVB 2013-1219-002, 1-7) from three individuals of *Paroaria capitata* (d'Orbigny et Lafresnaye,

**Table 1.** A list of birds captured and examined in San Rafael National Park (SR), Teniente Agripino Enciso National Park (AE), and Los Tres Gigantes Biological Station (TG), Paraguay in 2012.

Family/Species	No. of birds examined or No. of birds parasitized/examined			
	SR	AE	TG	Total
<b>Tinamidae</b>				
<i>Crypturellus tataupa</i> (Temmnick, 1815)	2			2
<b>Columbidae</b>				
<i>Claravis pretiosa</i> (Ferrari-Pérez, 1886)	1			1
<i>Columbina picui</i> (Temmnick, 1813)		1	4	5
<i>Columbina talpacoti</i> (Temmnick, 1810)	9			9
<i>Leptotila rufaxilla</i> (Richard et Bernard, 1792)	2			2
<i>Leptotila verreauxi</i> Bonaparte, 1855		1	1	2
<i>Patagioenas cayennensis</i> (Bonaparte, 1792)			1	1
<b>Trochilidae</b>				
<i>Chlorostilbon lucidus</i> (=aureoventris) (Shaw, 1812)		1/2		1/2
<i>Hylocharis chrysura</i> (Shaw, 1818)	4	2	1	7
<i>Phaethornis eurynome</i> (Lesson, 1832)	3			3
<i>Stephanoxis lalandi</i> (Vieillot, 1818)	1			1
<b>Trogonidae</b>				
<i>Trogon curucui</i> Linnaeus, 1766			2	2
<i>Trogon rufus</i> J.F. Gmelin, 1788	2			2
<b>Bucconidae</b>				
<i>Nystalus maculatus</i> (J.F. Gmelin, 1788)		1		1
<b>Ramphastidae</b>				
<i>Pteroglossus bailloni</i> (Vieillot, 1819)	2			2
<i>Selenidera maculirostris</i> (M.H.K. Lichtenstein, 1823)	2			2
<b>Picidae</b>				
<i>Veniliornis mixtus</i> (Boddaert, 1783)		1		1
<i>Picumnus temminckii</i> Lafresnaye, 1845	1			1
<i>Veniliornis passerinus</i> (Linnaeus, 1766)			1	1
<b>Psittacidae</b>				
<i>Myiopsitta monachus</i> (Boddaert, 1783)		2		2
<i>Pyrrhura frontalis</i> (Vieillot, 1818)	2			2
<b>Thamnophilidae</b>				
<i>Dysithamnus mentalis</i> (Temminck, 1823)	7			7
<i>Pyriglena leucoptera</i> (Vieillot, 1818)	1			1
<i>Taraba major</i> (Vieillot, 1816)		3	1	4
<i>Thamnophilus caerulescens</i> Vieillot, 1816	2			2
<i>Thamnophilus doliatus</i> (Linnaeus, 1764)			2	2
<b>Conopophagidae</b>				
<i>Conopophaga lineata</i> (Wied-Neuwied, 1831)	5			5
<b>Furnariidae</b>				
<i>Asthenes baeri</i> (Berlepsch, 1906)		2		2
<i>Automolus leucophthalmus</i> (Wied-Neuwied, 1821)	10			10
<i>Campylorhamphus trochilirostris</i> (Des Murs, 1849)			2	2
<i>Coryphistera alaudina</i> Burmeister, 1860		1		1
<i>Dendrocincla fuliginosa</i> (Vieillot, 1818)	6			6
<i>Dendrocolaptes platyrostris</i> Spix, 1824	3			3
<i>Furnarius cristatus</i> Burmeister, 1888		1		1
<i>Furnarius leucopus</i> Swainson, 1838			2	2
<i>Furnarius rufus</i> (J.G. Gmelin, 1788)		1	2	3
<i>Lepidocolaptes angustirostris</i> (Vieillot, 1818)		1	4	5
<i>Philydor atricapillus</i> (Wied-Neuwied, 1821)	2			2
<i>Anabacerthia lichtensteini</i> Cabanis et Heine, 1859	2			2
<i>Philydor rufum</i> (Vieillot, 1818)	2			2

Table 1 continuous

<i>Pseudoseisura lophotes</i> (Reichenbach, 1853)		1		1
<i>Schoeniophylax phryganophilus</i> (Vieillot, 1817)			1	1
<i>Sclerurus scansor</i> (Ménétriés, 1835)	1			1
<i>Sittasomus griseicapillus</i> (Vieillot, 1818)	6			6
<i>Synallaxis albilora</i> Pelzeln, 1856			2	2
<i>Synallaxis cinerascens</i> Temminck, 1823	4			4
<i>Synallaxis spixi</i> P.L. Sclater, 1856	1			1
<i>Syndactyla rufosupercilata</i> (Lafresnaye, 1832)	1			1
<i>Xenops minutus</i> (Sparrman, 1788)	4			4
<i>Xenops rutilans</i> Temminck, 1821	1			1
<i>Xiphorhynchus fuscus</i> (Vieillot, 1818)	4			4
<b>Tyrannidae</b>				
<i>Casiornis rufus</i> (Vieillot, 1816)		1	1	2
<i>Cnemotriccus fuscatus</i> (Wied-Neuwied, 1831)			3	3
<i>Corythopsis delalandi</i> (Lesson, 1830)	10			10
<i>Elaenia flavogaster</i> (Thunberg, 1822)	3			3
<i>Hemitriccus margaritaceiventer</i> (d'Orbigny et Lafresnaye, 1837)		6		6
<i>Hemitriccus obsoletus</i> (Ribeiro, 1906)	2			2
<i>Leptopogon amaurocephalus</i> Tschudi, 1846	10			10
<i>Megarynchus pitangua</i> (Linnaeus, 1766)			1	1
<i>Myiarchus ferox</i> (J.F. Gmelin, 1789)	3			3
<i>Myiarchus tyrannulus</i> (Statius Müller, 1776)			2	2
<i>Myiophobus fasciatus</i> (Statius Müller, 1776)	2			2
<i>Pitangus sulphuratus</i> (Linnaeus, 1766)			2	2
<i>Platyrinchus leucoryphus</i> Wied-Neuwied, 1831	4			4
<i>Platyrinchus mystaceus</i> Vieillot, 1818	10			10
<i>Ramphotrigon megacephalum</i> (Swainson, 1835)	7			7
<i>Serpophaga subcristata</i> (Vieillot, 1817)		2		2
<i>Stigmatura budytoides</i> (d'Orbigny et Lafresnaye, 1837)		2		2
<i>Todirostrum cinereum</i> (Linnaeus, 1766)			2	2
<i>Tolmomyias sulphurescens</i> (Spix, 1825)	1			1
<b>Pipridae</b>				
<i>Chiroxiphia caudata</i> (Shae et Nodder, 1793)	15			15
<i>Pipra fasciicauda</i> Hellmayr, 1906	3			3
<i>Piprites chloris</i> (Temminck, 1822)	1			1
<b>Tityridae</b>				
<i>Schiffornis virescens</i> (Lafresnaye, 1838)	7			7
<b>Vireonidae</b>				
<i>Cyclarhis gujanensis</i> (J.F. Gmelin, 1789)		4		4
<b>Troglodytidae</b>				
<i>Troglodytes aedon</i> Neumann, 1923	1	1	6	8
<i>Cantorchilus guarayanus</i> (d'Orbigny et Lafresnaye, 1837)			2	2
<b>Polioptilidae</b>				
<i>Polioptila dumicola</i> (Vieillot, 1817)		3		3
<b>Turdidae</b>				
<i>Turdus albicollis</i> Vieillot, 1818	12			12
<i>Turdus amaurochalinus</i> Cabanis, 1850	1	1	10	12
<i>Turdus leucomelas</i> Vieillot, 1818	3			3
<i>Turdus rufiventris</i> Vieillot, 1818	9		4	13
<b>Parulidae</b>				
<i>Basileuterus culicivorus</i> (Deppe, 1830)	13			13

Table 1 continuous

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<i>Myiothlypis leucoblephara</i> (Viellot, 1817)	7			7
<i>Geothlypis aequinoctialis</i> (J.G. Gmelin, 1789)	2			2
<i>Setophaga</i> (=Parula) <i>pitiayumi</i> (Viellot, 1817)		1/5	1	1/6
<b>Thraupidae</b>				
<i>Coryphospingus cucullatus</i> (Statius Müller, 1776)	2	6	1	9
<i>Oryzoborus angolensis</i> (Linnaeus, 1766)			2	2
<i>Paroaria capitata</i> (d'Orbigny et Lafresnaye, 1837)			3/21	3/21
<i>Paroaria coronata</i> (J.F. Miller, 1776)		13	1/44	1/57
<i>Poospiza melanoleuca</i> (d'Orbigny et Lafresnaye, 1837)			11	11
<i>Pyrrhocomma ruficeps</i> (Strickland, 1844)	1			1
<i>Saltator coerulescens</i> Viellot, 1817			8	8
<i>Saltator similis</i> d'Orbigny et Lafresnaye, 1837	2			2
<i>Sicalis flaveola</i> (Linnaeus, 1766)		3		3
<i>Tachyphonus coronatus</i> (Viellot, 1822)	5			5
<i>Thraupis sayaca</i> (Linnaeus, 1866)	1		2	3
<i>Tiaris fuliginosus</i> (Wied-Neuwied, 1830)	3			3
<i>Trichothraupis melanops</i> (Viellot, 1818)	13			13
<i>Volatinia jacarina</i> (Linnaeus, 1766)			1	1
<b>Emberizidae</b>				
<i>Zonotrichia capensis</i> (Linnaeus, 1766)	1		3	4
<b>Cardinalidae</b>				
<i>Cyanocopsa brissonii</i> (M.H.K. Lichtenstein, 1823)		2		2
<i>Habia rubica</i> (Viellot, 1817)	7			7
<b>Icteridae</b>				
<i>Agelaioides badius</i> (Viellot, 1819)			2	2
<i>Molothrus bonariensis</i> (J.G. Gmelin, 1789)	1			1
<i>Molothrus rufoaxillaris</i> Cassin, 1866	1			1
<b>Total</b>	<b>0/256</b>	<b>2/69</b>	<b>4/155</b>	<b>6/480</b>

1837) (Passeriformes: Thraupidae) [new host, new location], PARAGUAY: Los Tres Gigantes Biological Station (20°04'S, 50°09'W), 8 September 2012, coll. I. Literak (field numbers PG 426, 433, 436).

Prevalence. *N. tangara* was recorded on three (14%) of the 21 specimens of *P. capitata* and on one (2%) of 57 specimens of *P. coronata* examined.

This species was described from *Tangara cayana* (Linnaeus, 1766) (Passeriformes: Thraupidae) from Brazil (Bochkov and Literak, 2011). Recently *N. tangara* has been reported on *Thraupis episcopus* (Linnaeus, 1766) from Peru (Literak *et al.*, 2012).

*Neharpyrhynchus* aff. *spinus* Martinu, Dusbabek et Literak, 2008

Material examined. Ten females (ZISP AVB 2013-1219-003, 1-10) from *Setophaga*

(=Parula) *pitiayumi* (Viellot, 1817) (Passeriformes: Parulidae) [new host, new location], PARAGUAY: Teniente Agripino Enciso National Park, Headquarters Area (21°12'S, 61°39'W), 2 September 2012, coll. I. Literak (field number PG310).

Prevalence. *N. aff. spinus* was recorded on one (17%) of the 6 specimens of *Setophaga pitiayumi* examined.

*Neharpyrhynchus spinus* was described from *Carduelis spinus* (Linnaeus, 1758) (Passeriformes: Fringillidae) from the Czech Republic (Martinu *et al.*, 2008). The neharpyrhynchid mites from *S. pitiayumi* were morphologically indistinguishable from *N. spinus* from *C. spinus* but comparison with large series of *N. spinus* from the type host and/or the mite DNA analyses from mites collected on both host species are necessary to resolve the question concerning the status of the specimens from *S. pitiayumi*.

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