

External and gastrointestinal parasites of the rufous-collared sparrow *Zonotrichia capensis* (Passeriformes, Emberizidae) in Chile

Parasitas gastrointestinais e externos do tico-tico *Zonotrichia capensis* (Passeriformes, Emberizidae) do Chile

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Abstract

A total of 277 rufous-collared sparrows, *Zonotrichia capensis* Müller, 1776 (Emberizidae), were examined for external parasites. The birds were captured using mist nets in seven locations in northern and central Chile. Additionally, seven carcasses from central Chile (the Biobío region) were necropsied to evaluate the presence of endoparasite infection. Ectoparasites were found on 35.8% (99/277) of the examined birds and they were represented by the following arthropods: feather mites *Amerodectes zonotrichiae* Mironov and González-Acuña, 2014 (Analgoidea: Proctophyllodidae), *Proctophyllodes polyxenus* Atyeo and Braasch, 1966 (Analgoidea: Proctophyllodidae), and *Trouessartia capensis* Berla, 1959 (Analgoidea: Trouessartiidae); a louse *Philopterus* sp. (Phthiraptera: Ischnocera); and ticks *Amblyomma tigrinum* Koch, 1844 (Acari: Ixodidae) and *Ixodes auritulus* Neumann, 1904 (Acari: Ixodidae). Two of the seven necropsied carcasses were infected with the acanthocephalan *Mediorhynchus papillosus* Van Cleave, 1916 (Gigantorhynchida: Gigantorhynchidae). To our knowledge, this study reports *P. polyxenus*, *Philopterus* sp., *A. tigrinum*, and *M. papillosus* for the first time for *Z. capensis* and expands the distributional range for *T. capensis* to Chile.

Keywords: Ectoparasites, endoparasites, lice, mite, tick, *Zonotrichia capensis*.

Resumo

Um total de 277 tico-tico *Zonotrichia capensis* Müller, 1776 (Emberizidae) foram examinados em busca de ectoparasitos. As aves foram capturadas com redes em sete localidades do norte e centro do Chile. Além disso, sete carcaças do centro Chile (Região de Biobío) foram examinadas para avaliar a infecção por endoparasitos. Ectoparasitos foram encontrados em 35,8% (99/277) das aves examinadas com a identificação dos ácaros *Amerodectes zonotrichiae* Mironov and González-Acuña, 2014 (Analgoidea: Proctophyllodidae), *Proctophyllodes polyxenus* Atyeo and Braasch, 1966 (Analgoidea: Proctophyllodidae) e *Trouessartia capensis* Berla, 1959 (Analgoidea: Trouessartiidae), piolho *Philopterus* sp. (Phthiraptera: Ischnocera) e carrapatos *Amblyomma tigrinum* Koch, 1844 (Acari: Ixodidae) e *Ixodes auritulus* Neumann, 1904 (Acari: Ixodidae). Duas das sete carcaças examinadas foram infectadas com o Acanthocephala *Mediorhynchus papillosus* Van Cleave, 1916 (Gigantorhynchida: Gigantorhynchidae). Para o nosso conhecimento, este é o primeiro estudo para descrever *P. polyxenus*, *Philopterus* sp., *A. tigrinum* e *M. papillosus* em *Z. capensis* e expande a distribuição de *T. capensis* ao Chile.

Palavras-chave: Ectoparasitos, endoparasitos, piolho, ácaro, carrapato, *Zonotrichia capensis*.

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Introduction

The rufous-collared sparrow, *Zonotrichia capensis* Müller, 1776 (Emberizidae), inhabits almost all environments of the New World spanning from southern Mexico to Tierra del Fuego (Chile), excluding any areas covered with dense forests (CHESTER, 2008). This bird species can be found in cities and any other areas where forests have been cleared due to human activity; it also occurs at high altitudes, such as in the Altiplano (MILLER & MILLER, 1968). The bird's feeding behavior is mostly frugivorous, but it also preys insects with some seasonal variations in its diet throughout the year (NOVOA et al., 1996). In Chile, *Z. capensis* is distributed from Arica (18°28'30"S, 70°18'52"W) to Tierra del Fuego (53°36'00"S, 69°23'00"W). Five subspecies of *Z. capensis* are endemic in Chile: *Z. c. chilensis* from Arica to Aysén; *Z. c. antofagastae* from Arica to Antofagasta; *Z. c. australis* in the Andes from Santiago to Aysén; *Z. c. peruviansis* in Arica; and *Z. c. sanborni* from Atacama to Valparaíso (CHESTER, 2008).

Currently, *Z. capensis* does not face any conservation issues due to its ability to exploit different environments. However, at present, there is limited information regarding the parasite fauna of South-American birds, and *Z. capensis* is no exception (HINOJOSA-SÁEZ & GONZÁLEZ-ACUÑA, 2005). Previous studies of ectoparasites associated with *Z. capensis* recorded a number of arthropods and helminths from this bird in South America: the louse fly *Ornithoetona fusciventris* Wiedemann, 1830 (Diptera: Hippoboscidae) in Brazil (GRACIOLI & CARVALHO, 2003); mites *Acarus batatas* Linnaeus 1758 (Acari: Astigmata) in Guatemala (BRENNAN & DALMAT, 1960), *Amerodectes zonotrichiae* Mironov and González-Acuña, 2014 (Analgoidea: Proctophyllodidae) in Chile (MIRONOV & GONZÁLEZ-ACUÑA, 2014), *Analges* sp. (Analgoidea: Analgidae) and *Pterodectes* sp. (Analgoidea: Proctophyllodidae) (KANEGAE et al., 2008) in Brazil, *Ornithonyssus bursa* (Berlese, 1888) (Mesostigmata: Macronyssidae) in Argentina (SANTILLÁN et al., 2015), *Mesalgoides* sp. (Analgoidea: Psoroptoididae) in Brazil and Colombia (KANEGAE et al., 2008; BARRETO et al., 2012), and *Trouessartia capensis* Berla, 1959 (Analgoidea: Trouessartiidae) in Colombia, Argentina, Paraguay, and Brazil (SANTANA, 1976; KANEGAE et al., 2008; BARRETO et al., 2012); the lice *Menopon laticorpus* Carriker, 1903 (Phthiraptera: Menoponidae) in Costa Rica and Venezuela (PRICE et al., 2002) and *Menacanthus bonariensis* Burmeister, 1838 (Phthiraptera: Menoponidae) in Argentina (CICCHINO, 2003); and ticks *Ixodes auritulus* Neumann, 1904 (Acari: Ixodidae) in Chile (GONZÁLEZ-ACUÑA et al., 2005), *Amblyomma aureolatum* Pallas, 1772 (Acari: Ixodidae) in Brazil (GUGLIELMONE et al., 2003a), and *A. triste* Koch, 1844 in Argentina (NAVA et al., 2011). Endoparasites have rarely been reported in *Z. capensis* with records of *Anonchotaenia zonotrichicola* Dollfus, 1959 (Cestoda: Paruterinidae) in Peru (DOLLFUS, 1959); *A. globata* von Linstow, 1879 in an unspecified location of South America (RAUSCH & MORGAN, 1947); and *Lubens lubens* Braun, 1901 (Digenea: Dicrocoeliidae) in Brazil (TRAVASSOS et al., 1969).

The main purpose of this study is to document new records of the ecto- and endoparasites of the rufous-collared sparrow, *Z. capensis*, in Chile.

Materials and Methods

This study was performed in seven locations throughout northern and central Chile: Llanos del Challe National Park (28°10'S, 71°00'W); Las Chinchillas National Reserve (31°28'S, 71°03'W); Bosques de Fray Jorge National Park (30°39'S, 71°41'W); Lago Peñuelas National Reserve (33°10'S, 71°29'W); La Campana National Park (32°58'S, 71°05'W); Tiltill (33°05'S, 70°55'W); and Termas del Flaco (34°57'S, 70°25'W) (Figure 1).

Between April 2010 and August 2014, a total of 277 *Z. capensis* were caught using three mist nets in each locality (two 12 × 2.8 m nets and one 18 × 2.8 m net). The hosts were externally inspected with the naked eye and a magnifier in searching for ectoparasites. Feathers on the wings, tail, head, neck, flanks, back and abdomen were closely examined for ectoparasites. The birds were banded and released in the same place where they were captured. All capture and handling procedures were authorized by the Agricultural and Livestock Services (SAG; Resolution N°2012).

Following collection, the ectoparasites were preserved in 70% ethanol. Lice were cleared using 20% KOH and ascending concentrations of ethanol solutions (40%, 70%, and 96%); they were subsequently mounted using Canada balsam, as indicated in Palma (1978) and Price et al. (2003). Lice were identified using the keys and descriptions of Price et al. (2003); moreover, the body measurements of these lice were taken. Mites were cleared using Nesbitt's solution (40 g of chloral hydrate, 25 mL of distilled water, and 2.5 mL of hydrochloric acid) for 72 h, and then they were mounted in Berlese solution (KRANTZ, 1978). Mite identification was performed using keys constructed by Flechtman (1975) and Gaud & Artyeo (1996).

In addition to the birds examined in the field, seven carcasses of the rufous-collared sparrows from the Biobío region were necropsied for endoparasites using the protocols detailed in Kinsella & Forrester (1972). Acanthocephalans were cleared and studied in temporary mounts of 80% phenol and then returned to the preservative. These sparrows died for different reasons (i.e., they were either road killed, or they died as a result of predator attacks, poisoning, or illegal hunting), and they were subsequently brought to the Facultad de Ciencias Veterinarias of Universidad de Concepción, Chillán. Endoparasites were identified following the keys of Schmidt & Kuntz (1977) and Amin & Dailey (1998). Specimens collected were stored in the parasite collection from the Department of Animal Sciences, Universidad de Concepción, with access numbers CDCA-UDEC 132, CDCA-UDEC 133, CDCA-UDEC 134, CDCA-UDEC 135, CDCA-UDEC 136, and CDCA-UDEC 137.

The terminology used to describe parasitic assemblages (prevalence, mean intensity, and mean abundance) follows that of Bush et al. (1997). 'Range' displays the minimum and maximum number of individuals of a particular parasite species collected from the least and most infested hosts. The prevalence, mean intensity, mean abundance, and range were calculated for lice. In the case of mites, prevalence was the only estimated parameter, as it is extremely difficult to calculate accurately the abundance, range, and intensity of mites on live birds with the methods applied in this study. Population parameters were not obtained

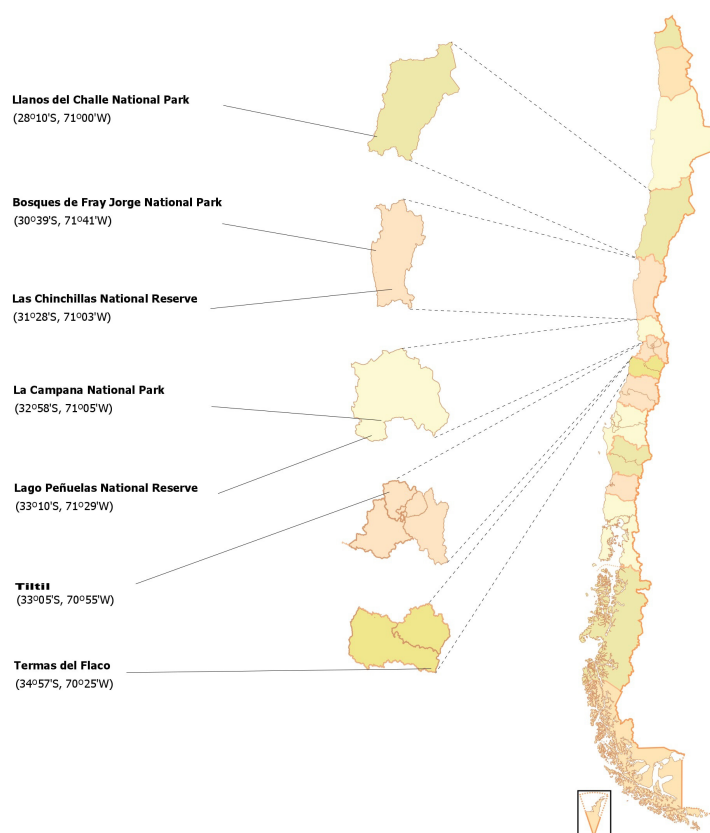


Figure 1. Locations where individuals of *Zonotrichia capensis* were captured during this study.

for ticks and endoparasites, because only a few individuals were collected for both groups of parasites. Ectoparasites collected from the seven rufous-collared sparrow carcasses were not considered for the numeric analysis, as in most cases, the parasites tended to abandon their former hosts after the host's death.

Results and Discussion

Ectoparasites were found in 35.8% (99/277) of the rufous-collared sparrows examined in this study. The following groups of ectoparasites were recorded: three feather mite species from the suborder Astigmata; one chewing louse; and two ixodid tick species. In the case of endoparasites, a single specimen of *Acanthocephala* was recorded in two of seven necropsied sparrows.

Ectoparasites

Astigmata

Three feather mite species of the superfamily Analgoidea were found in 27.1% (75/277) of the sparrows examined. These mites were identified as *Amerodectes zonotrichiae* Mironov and González-Acuña, 2014 (Figure 2), *Proctophyllodes polyxenus* Atyeo and Braasch, 1966 (Analgoidea: Proctophyllodidae) (Figure 3) and *Trouessartia capensis* Berla, 1959 (Analgoidea: Trouessartiidae) (Figure 4).

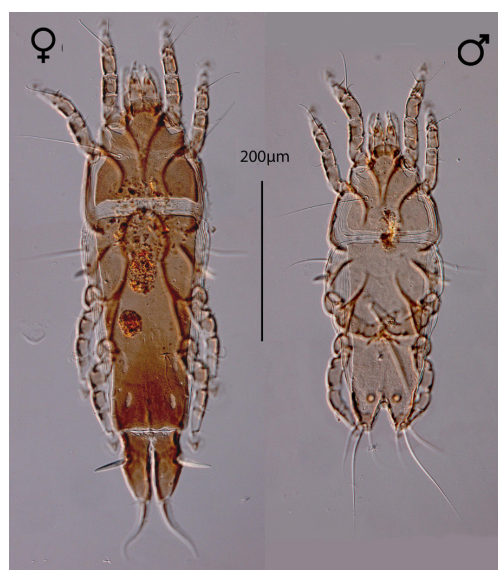


Figure 2. Female and male *Amerodectes zonotrichiae* (400X magnification).

Representatives of *A. zonotrichiae* were found on 1.44% (4/277) of bird specimens. These mites were found on vanes of the wing feathers of the sparrows (mainly primaries, secondaries, tertialis and rectrices), where they were located in corridors formed by barbs. These locations are the most common for feather mites of the family Proctophyllodidae (MIRONOV & GONZÁLEZ-ACUÑA,

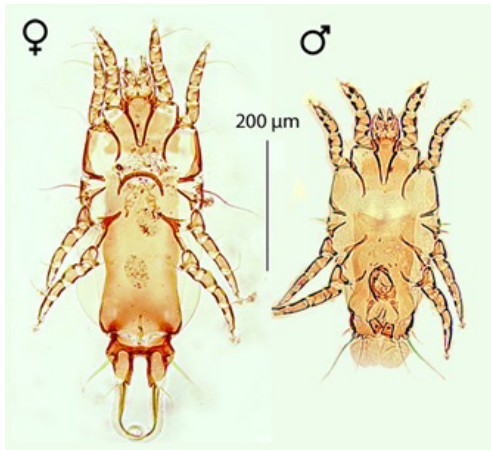


Figure 3. Female and male *Proctophyllodes polyxenus* (400X magnification).

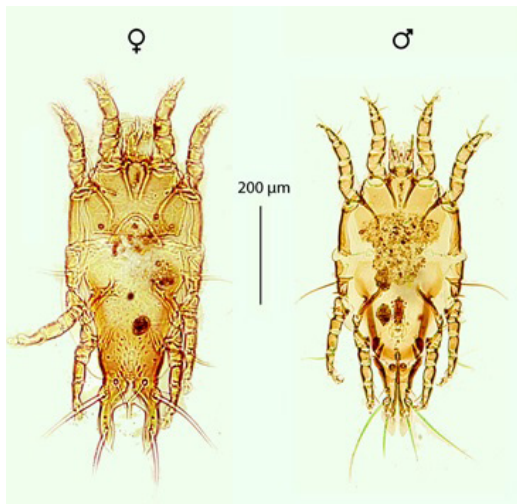


Figure 4. Female and male *Trouessartia capensis* (400X magnification).

2011). Specimens were collected from birds captured in Llanos del Challe National Park, Las Chinchillas National Reserve, Bosques de Fray Jorge National Park, Lago Peñuelas National Reserve, La Campana National Park and Tiltill. Of pterodectine genera restricted to passerines of the New World, the genus *Amerodectes* Valim and Hernandez, 2010 is the most speciose and currently includes 28 species parasitizing a wide spectrum of passerines belonging to 11 families: Cardinalidae, Emberizidae, Furnariidae, Icteridae, Mimidae, Parulidae, Thraupidae, Turdidae, Troglodytidae, Tyrannidae and Veronidae (MIRONOV et al., 2008; VALIM & HERNANDES, 2010; MIRONOV & GONZÁLEZ-ACUÑA, 2011, 2014; MIRONOV & OCONNOR, 2014; MIRONOV & OVERSTREET, 2015; HERNANDES et al., 2016). Mites of this genus has been recorded on passerines from Galapagos Islands (Ecuador) (VALIM & HERNANDES, 2010; VILLA et al., 2013); the United States (VALIM & HERNANDES, 2010; HRIBAR, 2013, 2014; MIRONOV & OCONNOR, 2014; MIRONOV & OVERSTREET, 2015); Guatemala (VALIM & HERNANDES, 2010); Surinam (ČERNÝ, 1974; VALIM & HERNANDES, 2010); Argentina (VALIM & HERNANDES, 2010); Colombia (BARRETO et al., 2012); Brazil (BERLA, 1958;

VALIM & HERNANDES, 2006, 2010; BARRETO et al., 2012; MENDES et al., 2012; ENOUT et al., 2012; SILVA et al., 2015; HERNANDES et al., 2016) and Cuba (MIRONOV & GONZÁLEZ-ACUÑA, 2011; MIRONOV & GONZÁLEZ-ACUÑA, 2014). In Chile, *A. zonotrichiae* was originally found on *Z. capensis* in Atacama Region (MIRONOV & GONZÁLEZ-ACUÑA, 2014). Other *Amerodectes* species were recorded in this country on *Sturnella loyca* (Icteridae) and *Phrygilus patagonicus* (Emberizidae) in Los Lagos Region, and on *Sicalis luteola* (Emberizidae) in Biobío Region (SOTO et al., 2013; MIRONOV & GONZÁLEZ-ACUÑA, 2011).

Representatives of *P. polyxenus* were found in 1.4% (4/277) of the examined bird individuals. As the previous feather mite, this species is a typical inhabitant of the flight feathers of the wings and tail feathers having large and firm vanes. However, these mite, as for most proctophyllodines, usually occupy vane areas which are closer to the rachis than pterodectines (MIRONOV, 2009). Specimens of this mite were collected from sparrows captured in Bosques de Fray Jorge National Park and Tiltill. *Proctophyllodes polyxenus* is a feather mite uncommonly widely distributed among passerine hosts; it has been recorded so far from 37 passerine species of the families Calcariidae, Cardinalidae, Emberizidae, Motacillidae, Parulidae, Passerellidae, Thraupidae, and Turdidae in the New World. All records of this mite were made from hosts captured in the USA, Mexico, and in a minor part in Canada (Newfoundland) (ATYEO & BRAASCH, 1966). It is necessary to note that the authors of this species admitted that this so widely distributed mite could represent in fact a complex of very closely related or cryptic species. However, this question has never been specifically examined by statistic or molecular-based methods. Among numerous passerine hosts, *P. polyxenus* was previously recorded on three sparrow species of the genus *Zonotrichia*, – *Z. albicollis* (Gmelin), *Z. leucophrys* (Forster) and *Z. querula* (Nuttall) in the United States (ATYEO & BRAASCH, 1966). The present study reports *Z. capensis* as a new host of *P. polyxenus* and expands its geographical range of this mite to Chile.

The genus *Proctophyllodes* Robin, 1868 is the species-richest in the family Proctophyllodidae and among all families of feather mites currently including about 170 species (ATYEO & BRAASCH, 1966; MIRONOV, 2012, 2017; WANG et al., 2014). Representatives of this genus are distributed worldwide, predominately parasitize oscine passerines and have been recorded from 35 families of this grouping (as classified by THE CORNELL LAB OF ORNITHOLOGY, 2016). Additionally, three *Proctophyllodes* species are found on suboscine passerines of the families Furnariidae, Pittidae, and Tyrannidae, and a single species is known from each of the following non-passerine orders, Apodiformes (Trochilidae), Charadriiformes and Piciformes (ATYEO & BRAASCH, 1966). The world revision of the genus *Proctophyllodes* was carried out by Atyeo & Braasch (1966) and this monograph is still the main taxonomic work of this genus and the only key for identification of its species. The fauna of the genus *Proctophyllodes* on passerines of the New World currently includes about 70 species (ATYEO & BRAASCH, 1966; OCONNOR et al., 2005; GALLOWAY et al., 2014; MIRONOV & OCONNOR, 2014).

Trouessartia capensis was collected from 7.2% (20/277) of the sparrows examined. This mite was found on these birds in Las

Chinchillas National Reserve, Bosques de Fray Jorge National Park, Lago Peñuelas National Reserve, La Campana National Park, and Tiltil.

Trouessartia capensis was originally described from *Z. capensis subtorquata* in Brazil (BERLA, 1959); it was later recorded on *Z. capensis* from Brazil and Colombia (KANEGAE et al., 2008; BARRETO et al., 2012), *Z. capensis mellea* from Argentina, *Z. capensis subtorquata* from Paraguay, and *Z. capensis insularis* from Curaçao Island (SANTANA, 1976). Our study indicates, for the first time, the presence of *T. capensis* on rufous-collared sparrows in Chile. Additionally, this mite species was previously reported from various passerines of the New World: *Ammodramus savannarum floridanus* (Emberizidae) from the United States (FORRESTER & SPALDING, 2003); and *Hylocryptus rectirostris* (Furnariidae), *Leptopogon amaurocephalus* (Tyrannidae), *Elaenia chiriquensis*, *E. cristata* (Tyrannidae), *Trichothraupis melanops*, and *Eucometis penicillata* (Thraupidae) from Brazil (KANEGAE et al., 2008). However, the records of *T. capensis* from birds other than those from the family Emberizidae are quite questionable, and they may possibly represent misidentifications.

Phthiraptera

A total of 170 individuals belonging to the genus *Philopterus* Nitzsch, 1818 (Phthiraptera: Ischnocera) were identified from 10.83% (30/277) of the rufous-collared sparrows examined (Figure 5). The genders of 82 individuals were identified, including 58.54% (n=48) of nymphs and 41.46% (n=34) of adults. The *Philopterus* sp. was collected from this bird species across all of the sites that were visited during this study. The population parameters for *Philopterus* sp. are indicated in Table 1.

Lice of the genus *Philopterus* primarily parasitize passerine birds; it is one of the most speciose genera of the ischnoceran family Philopteridae, with more than 210 species and subspecies (PRICE & HELLENTHAL, 1998). This is the first record of lice of the genus *Philopterus* on *Z. capensis*. The body measurements of the collected lice are indicated in Table 2. Louse specimens collected in this study probably represent a new species, particularly since they differ in terms of certain morphological features when compared to other known species of the same genus (PRICE & HELLENTHAL, 1998).

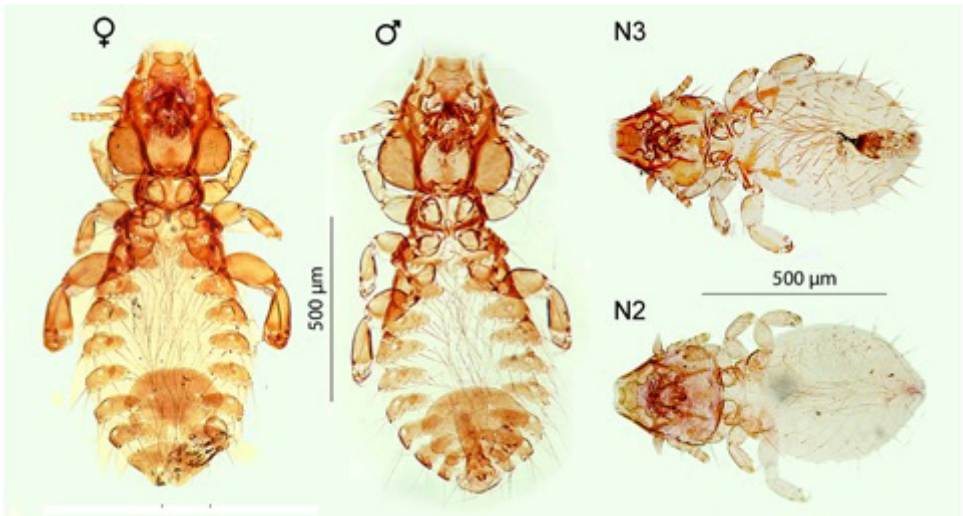


Figure 5. Female and male *Philopterus* sp. and two nymphs (N2 and N3) (100X magnification).

Table 1. Population parameters of *Philopterus* sp. collected from rufous-collared sparrows (*Zonotrichia capensis*).

Lice	Nº of captured birds	Positive birds	Prevalence %	Mean intensity	Mean abundance	Range
<i>Philopterus</i> sp.	277	30	10.83	5.66	0.61	1-40

Table 2. Mean body measurements (μm) of *Philopterus* sp. collected from rufous-collared sparrows (*Zonotrichia capensis*).

Body structure	Male		Female	
	Length	Width	Length	Width
Head	450.14	407.39	490.17	459.51
Prothorax	116.02	244.98	129.38	266.07
Pterothorax	128.39	360.54	161.85	403.95
Abdomen	661.52	528.10	869.13	608.79

Ticks

Only three tick larvae were collected from the sparrows. Two ticks were identified as *Amblyomma tigrinum* Koch, 1844 (Figure 6) and one as *Ixodes auritulus* Neumann, 1904 (Acari: Ixodidae) (Figure 7). *Amblyomma tigrinum* and *I. auritulus* were collected in the Bosques de Fray Jorge National Park and Termas del Flaco, respectively.

Amblyomma tigrinum, commonly referred to as 'the white-ribbed dog tick', parasitizes carnivores and birds in South America. Adult ticks primarily feed on domestic and wild carnivores, as well as on other members of the family Canidae; they occasionally feed on humans (GUGLIELMONE et al., 2000). During its larval and nymph stages, this tick can be found on wild birds and rodents (NAVA et al., 2006). *Amblyomma tigrinum* adapts to hosts living in different habitats that are found in the lowlands of Central Chile, or in high-altitude areas in the Peruvian Andes (MENDOZA & CHÁVEZ-CHOROCO, 2004; GONZÁLEZ-ACUÑA & GUGLIELMONE, 2005). It has also been reported in Bolivia, Argentina, French Guiana, Paraguay, Uruguay, Venezuela, and Brazil (JONES et al., 1972; GONZÁLEZ-ACUÑA et al., 2004). In Chile, it has been described to parasitize such bird species as *Nothoprocta perdicaria* (Tinamidae), *Callipepla californica*

(Odontophoridae), and *Zenaida auriculata* (Columbidae) (GONZÁLEZ-ACUÑA et al., 2004). It is likely that populations of *Z. capensis* and other possible host species, such as *Lycalopex culpaeus*, are assisting in the maintenance of the endemic status of *A. tigrinum* in Bosques de Fray Jorge National Park. This is the first record of *A. tigrinum* on *Z. capensis*.

Ixodes auritulus is commonly recorded as a parasite of land birds in South America, primarily from the Turdidae and Furnariidae families (GONZÁLEZ-ACUÑA et al., 2005). It inhabits areas with low temperatures, such as mountainous environments, or in lowlands featuring cold or temperate climates (BERMÚDEZ et al., 2015). This species has been reported from different hosts in Guatemala, Panamá, Venezuela, Costa Rica, Ecuador, Peru, Brazil, Uruguay, Argentina, and Chile, but it is also distributed in the Ethiopian, Nearctic, and Australian regions (GUGLIELMONE et al., 2003b; BERMÚDEZ et al., 2015). Its subspecies *I. a. zealandicus* was found on seabirds from the New Zealand sub-region (HEATH et al., 2011). In Chile, *I. auritulus* has been previously recorded on *Z. capensis*, *Cinclodes fuscus* (Furnariidae), *C. antarcticus*, *Aphrastura spinicauda* (Furnariidae), *Elaenia albiceps* (Tyrannidae), *Pygarrhichas albogularis* (Furnariidae), *Troglodytes* sp. (Troglodytidae), *Curaeus curaeus* (Icteridae), and *Turdus falcklandii* (Turdidae) (GONZÁLEZ-ACUÑA et al., 2005).

Endoparasites

Two endoparasite specimens were isolated from two of the seven birds carcasses examined. Both were identified as *Mediorhynchus papillosus* Van Cleave, 1916 (Gigantorhynchida: Gigantorhynchidae).

The genus *Mediorhynchus* includes 35 species parasitizing the small intestine of wild birds all over the world (SCHMIDT & KUNTZ, 1977). Detailed information about the life cycle of this genus is unknown for most species. Studies of *M. centurorum* indicated that this parasite infects cockroaches as intermediary hosts during its larval stage before being transmitted to birds through ingestion (JACKSON & NICKOL, 1979).

Mediorhynchus papillosus has been previously recorded in a wide range of bird families, primarily in North America, with fewer reports in Eurasia. This acanthocephalan has been reported in *Tringa erythropus* (Scolopacidae) in Bulgaria (DIMITROVA & GENOV, 1992); *Calliope calliope* (Muscicapidae) in Russia; *Alauda gulgula wattersi* (Alaudidae) and *Dicrurus macrocercus* (Dicruridae) in Taiwan; *Alauda arvensis pescadores* in the Pescadores Islands (SCHMIDT & KUNTZ, 1977); *Passer domesticus* (Passeridae) in Brazil (BRASIL & AMATO, 1992); and *Charadrius vociferus* (Charadriidae), *Colinus virginianus* (Odontophoridae), *Contopus virens* (Tyrannidae), *Sayornis phoebe* (Tyrannidae), *Pooecetes gramineus* (Emberizidae), *Melospiza melodia* (Emberizidae), *Ammodramus maritima* (Passerellidae), *Agelaius phoeniceus* (Icteridae), *Oreoscoptes montanus* (Mimidae), *Petrochelidon pyrrhonota* (Hirundinidae), *Tachycineta bicolor* (Hirundinidae), *Porzana carolina* (Rallidae), *Tympanuchus cupido* (Phasianidae), and *Numenius americanus* (Scolopacidae) in the United States (VAN CLEAVE, 1947; WEBSTER, 1948; HUNTER & QUAY, 1953; ECKMAN, 1968; KAYTON & SCHMIDT, 1975; BUTLER & PFAFFENBERGER, 1981;

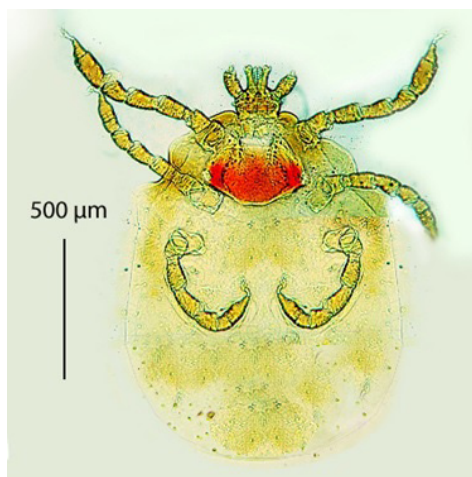


Figure 6. *Amblyomma tigrinum* larva (100X magnification).

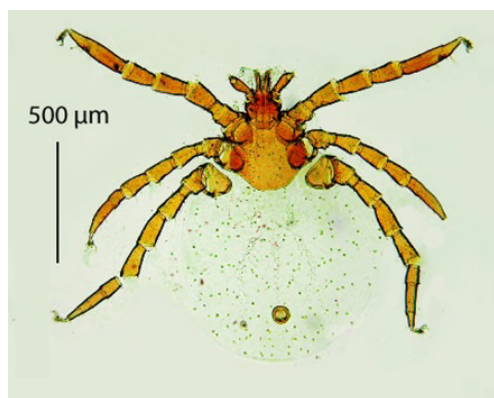


Figure 7. *Ixodes auritulus* larva (100X magnification).

SHERWIN & SCHMIDT, 1988; WALLACE & OLSEN, 1996; AMIN & DAILEY, 1998; BRUNO et al., 2015).

This is the first record of *M. papillosus* from *Z. capensis* and the first record of this acanthocephalan in Chile. It is possible that *M. papillosus* infects a much wider range of bird species in Chile and South America due to its generalist behavior and cosmopolitan distribution. Additional information about its intermediary and definitive hosts is required to better understand the ecology of this parasite in South America.

This scientific work contributes to the knowledge about the prevalence and diversity of parasites occurring in *Z. capensis*, as three feather mites, *A. zonotrichiae*, *P. polyxenus* and *T. capensis*; a louse, *Philopterus* sp.; two ixodid ticks, *A. tigrinum* and *A. auritulus*; and an acanthocephalan, *M. papillosus*, were recorded. For the first time, this study reports the occurrence of *Philopterus* sp., *A. tigrinum*, and *M. papillosus* on *Z. capensis*, and it expands the distributional range of *T. capensis* to Chile.

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