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COCCIDIA IN PASSERINES FROM THE LA LOMA SANTA MARIA PROTECTED NATURAL AREA, MICHOACAN, MEXICO

**COCCIDIAS EN PASSERIFORMES DEL ÁREA NATURAL
PROTEGIDA LA LOMA DE SANTA MARÍA,
MICHOACÁN, MÉXICO**

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Coccidia in Passerines from the la Loma Santa Maria Protected Natural Area, Michoacan, Mexico

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ABSTRACT

The objective of the present study was to find the presence of coccidia in passerine birds in the La Loma de Santa María Protected Natural Area, Michoacán, Mexico. Non-sporulated coccidial oocysts were found in passerine birds in that locality. A total of 61 birds were captured during three field surveys from December 2022 to April 2023, obtaining fecal samples that were examined. A total of 39 samples examined were positive for non-sporulated coccidial oocysts. The bird species sampled were: Red Warbler (*Cardellina rubra*)¹; Russet Ruiset Thrush (*Catharus occidentalis*)¹; Cordilleran Flycatcher (*Empidonax occidentalis*)²; Yellow-throated euponia (*Euphonia hirundinacea*)¹; common finch (*Haemorhous mexicanus*)¹; Nashville Warbler (*Leiothlypis ruficapilla*)¹; Blue mockingbird (*Melanotis caerulescens*)⁶; Lincoln's sparrow (*Melospiza lincolni*)⁴; Rusty-crowned ground sparrow (*Melospiza kieneri*)¹; Black and white warbler (*Mniotilta varia*)³; Brown-backed Solitaire (*Myadestes occidentalis*)¹; Slate-colored Solitaire (*Myadestes unicolor*)²; Yellow-tailed grackle (*Quiscalus mexicanus*)⁷; Yellow-rumped Warbler (*Setophaga coronata*)¹; Plumbeous Vireo (*Vireo plumbeus*)¹. This is the first study to examine passerine birds from Michoacán.

Keywords: coccidia, Mexico, passerines

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Coccidias en Passeriformes del Área Natural Protegida la Loma de Santa María, Michoacán, México

RESUMEN

El objetivo del presente estudio fue encontrar la presencia de coccidias en aves passeriformes, en el Área Natural Protegida La Loma de Santa María, Michoacán, México. Se encontraron ooquistes de coccidios no esporulados en aves passeriformes, en esa localidad. Se capturaron un total de 61 aves durante tres muestreos de campo desde diciembre de 2022 hasta abril de 2023, obteniendo muestras de heces que fueron examinadas. Un total de muestras examinadas fueron 39 positivas a ooquistes de coccidios no esporulados. Las especies de aves muestreadas fueron: Reinita Roja (*Cardellina rubra*)¹; Zorzal Ruiset Russet (*Catharus occidentalis*)¹; Papamoscas Cordillerano (*Empidonax occidentalis*)²; Eufonía de garganta amarilla (*Euphonia hirundinacea*)¹; Pinzón común (*Haemorhous mexicanus*)¹; Reinita de Nashville (*Leiothlypis ruficapilla*)¹; Sinsonte azul (*Melanotis caerulescens*)⁶; Gorrión de Lincoln (*Melospiza lincolni*)⁴; Gorrión de tierra corona oxidada (*Melospiza kieneri*)¹; Reinita blanca y negra (*Mniotilta varia*)³; Solitario de lomo marrón (*Myadestes occidentalis*)¹; Solitario de color pizarra (*Myadestes unicolor*)²; Zanate de cola amarilla (*Quiscalus mexicanus*)⁷; Reinita rabadilla amarilla (*Setophaga coronata*)¹; Vireo plumizo (*Vireo plumbeus*);)¹. Este es el primer estudio que examina aves passeriformes de Michoacán.

Palabras clave: coccidios, México, passeriformes

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INTRODUCTION

Protozoa parasites of the genera *Eimeria* or *Isospora* infect avian species. In diseased birds, signs may include diarrhea, fever, inappetence, weight loss and emaciation (SEMARNAT 2016; Villaseñor 2005). Nevertheless, many infections are subclinical (Constable 2014). Other vertebrates can be parasitized with coccidia, being *Isospora* Schneider 1881, considered the genus most important, before the genus *Eimeria* Schneider 1875 (Pereira et al. 2011).

The passerine order contains more than half of the world's birds, considered the most diversified group of vertebrates with more than 5,700 identified in 110 families of this taxonomic order (Ohlson et al. 2013) 46 families with 533 species a total at distribute in Mexico (Berlanga et al. 2020). La Loma de Santa María Protected Natural Area Michoacan, Mexico 23 families including been registered 97 species of passerines (iNaturalist 2017; Shivaprasad 2014).

There is almost no research on the presence of coccidia in wild birds from Mexico (Pereira and Lopes 2013) and nothing from the state of Michoacan. The presence of coccidia in passerine birds at Michoacan State are unknown. Hence the aim this present study was the identification of the presence of coccidia oocysts in passerines birds from the La Loma de Santa Maria Protected Natural Area, Michoacan, Mexico.

METHODOLOGY

Sixty-two passerines were caught with six mist nets (19°40'41'' N; 101°10'23'' W), on and longitudinal gradient ranging from 1,920 to 2,390 (m a.l.s.) (Chávez, 1993) from October 2022 to April 2023, the mist nets were placed in the first 7 hours after dawn for three days followed for visit, with sufficient distance between them so as not to interfere with the capture and in its manipulation. The birds were withdrawing from the nets and placed in cotton bags designed for this activity, after defecation were released, the stool samples, were processed by the technique of direct observation, with an ocular microscope in 10X and 40X objectives. The activity was carried out with the scientific collection permit number 08964 granted by the secretary of environment and natural resources (Gobierno Constitucional del Estado de Michoacán de Ocampo 2009; Fair et al. 2010; NOM-059-SEMARNAT-2010; Ralph and Sauer 1995; SEMARNAT 2016).



RESULTS

The 62 stool samples, were processed periodically according to corresponding field sampling within 12 hours after the collection (Ralph and Sauer 1995). Positive results to unsporulated coccidia oocysts were found in 39 samples, however they were all kept refrigerated at 7°C, and processed again (all at the same time) to confirm their absolute positivity (Rodríguez and Cob 2005). The second processing of the samples was carried out in Centro de Investigación y Estudios Avanzados en Salud Animal (CIESA). A total of 39 of them positive to unsporulated coccidia oocysts; Red Warbler (*Cardellina rubra*) (1); Russet Nightingale-Thrush (*Catharus occidentalis*) (1); Cordilleran Flycatcher (*Empidonax occidentalis*) (2); Yellow-throated Euphonia (*Euphonia hirundinacea*) (1); House Finch (*Haemorhous mexicanus*) (1); Nashville Warbler (*Leiothlypis ruficapilla*) (1); Blue Mockingbird (*Melanotis caerulescens*) (6); Lincoln's Sparrow (*Melospiza lincolnii*) (4); Rusty-crowned Ground-Sparrow (*Melospiza kieneri*) (1); Black and White Warbler (*Mniotilta varia*) (3); Brown-backed Solitaire (*Myadestes occidentalis*) (1); State-colored Solitaire (*M. unicolor*) (2); House Sparrow (*Passer domesticus*) (1); Hepatic Tanager (*Piranga flava*) (1); Great-tailed Grackle (*Quiscalus mexicanus*) (7); Yellow-rumped Warbler (*Setophaga coronata*) (1); Curve-billed Tanager (*Toxostoma curvirostre*) (3); Warbling Vireo (*Vireo gilvus*) (1) and Plumbeous Vireo (*V. plumbeus*) (1), that represent the 62% of positivity of the total samples obtained in that period.

DISCUSSION

63% of the birds studied were positive to unsporulated coccidia oocysts, significant results because of 61 birds captured, 39 were positive, representing more than 50% of parasitized passerine birds of the presence of these unicellular parasites in four endemic birds; Red Warbler (*Cardellina rubra*); Russet Nightingale-Thrush (*Catharus occidentalis*); Blue Mockingbird (*Melanotis caerulescens*); Rusty-crowned Ground-Sparrow (*Melospiza kieneri*) (Berlanga et al. 2020). The difficult to detect and study in protected areas being important to confirm its biological value and reinforce the arguments for its protection. More studies are needed to better understand the coccidias that infect passerine birds, considering that the information on this parasitic disease in wild birds is insufficient to generate research that strongly documents what is happening with these apicomplexan parasites and their impact on the health of wild birds. Afterwards, we performed an extensive search of the following



keywords (in Spanish, English, and Latin): coccidia, coccidiosis, oocyst, oocysts, oocisto, oocistos, *Eimeria*, *Isospora*, ave, aves, pájaro, pájaros, bird, birds, passerine, Passeriformes, Mexico, in the most popular databases (e.g. Web of Knowledge, PubMed, Searchable Ornithological Research Archive, Scopus, SciELO, Redalyc). Some studies were found on the presence of coccidia in passerines in the State of Mexico, which was useful to strengthen the present study. A publication on coccidia in wild passerines from the Americas was also found but did not show records for Mexico (Pereira and Lopes 2013). Therefore, our study appears to provide the first evidence of the presence of coccidia in passerine birds in the west of the country.

CONCLUSIONS

The resistance of the coccidia oocyst in the environment and the immune conditions of the hosts make them susceptible to suffering from coccidia. Let us remember that it was only in a limited area, with the possibility that the negative processed samples could be false negatives.

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