



## Research note

# First records of parasites from the Long-tailed Meadowlark *Sturnella loyca* (Passeriformes: Icteridae) from the Biobío Region, Chile

## Primer registro de parásitos de la loica *Sturnella loyca* (Passeriformes: Icteridae) de la región del Biobío, Chile

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**Abstract.** A total of 27 Long-tailed Meadowlarks *Sturnella loyca* (Molina, 1782) from the Biobío Region were examined between January 2005 and December 2008. Birds were infected with chewing lice (Phthiraptera), feather mites (Acari), and helminths (Platyhelminthes, Acanthocephala). Three species of chewing lice were found: *Brueelia boae* Cicchino and Castro, 1996 (26% prevalence), *Menacanthus leistidis* Cicchino, 1984 (7.4%), and *Menacanthus sturnellae* Price, 1977 (7.4%). Mites included 4 taxa: *Amerodectes* sp. (Mironov, 2008) (14.8%), *Harphyrhynchoides* sp. (Fain, 1972) (7.4%), *Mesalgoides* sp. (Fain, 1972) (3.7%), and *Proctophyllodes* sp. (Robin, Mégnin, 1877) (3.7%). Gastrointestinal helminths included the cestode *Anonchotaenia longiovata* (Fuhrmann, 1901) (18%) and the acanthocephalan *Mediorhynchus robustus* (Van Cleave, 1916) (3.7%). With the exception of *B. boae* and *M. leistidis*, all parasites represent new records for this passerine bird species.

Key words: helminths, gastrointestinal, ectoparasites, mites, lice, Chile.

**Resumen.** Se analizaron 27 loicas *Sturnella loyca* (Molina, 1782) procedentes de la región del Biobío entre enero de 2005 y diciembre de 2008. Se recolectaron piojos (Phthiraptera), ácaros de plumas (Acari) y helmintos (Platyhelminthes, Acanthocephala). Se identificaron 3 especies de piojos: *Brueelia boae* Cicchino y Castro, 1996 (26% prevalencia), *Menacanthus leistidis* Cicchino, 1984 (7.4%) y *Menacanthus sturnellae* Price, 1977 (7.4%). Los ácaros incluyeron 4 taxa: *Amerodectes* sp. (Mironov, 2008) (14.8%), *Harphyrhynchoides* sp. (Fain, 1972) (7.4%), *Mesalgoides* sp. (Fain, 1972) (3.7%) y *Proctophyllodes* sp. (Robin, Mégnin, 1877) (3.7%). Los helmintos gastrointestinales encontrados fueron: el cestodo *Anonchotaenia longiovata* (Fuhrmann, 1901) (18%) y el acantocéfalo *Mediorhynchus robustus* (Van Cleave, 1916) (3.7%). Con excepción de *B. boae* y *M. leistidis*, todos los parásitos representan nuevos registros para esta especie.

Palabras clave: helmintos, gastrointestinal, ectoparásitos, ácaros, piojos, Chile.

The Long-tailed Meadowlark, *Sturnella loyca* (Molina, 1782) (Passeriformes: Icteridae) inhabits the cold temperate region of South America. In Chile, it can be found from Copiapó (Atacama Region, 27°22'02" S, 70°20'04" W) to Tierra del Fuego (Magallanes Region, 54°01'54" S, 68°31'13" W) (Araya and Millie, 2000) and from the coast and continental islands to an altitude of 2 500 m (Goodall

et al., 1957). Its preferred habitats include areas with moist terrain and shrubs (Couve and Vidal, 2003), close to pastures (De la Peña and Rumbol, 1998), as well as coastal ravines and open grass areas (Couve and Vidal, 2003). Long-tailed Meadowlarks are also commonly observed in urban areas (Estades, 1995; Urquiza and Mella, 2002). In addition, it is considered a beneficial species for the maintenance of healthy ecosystems (SAG, 2007).

Although it is well known that wild birds harbor a large variety of parasites (Figueiroa et al., 2002), only a handful

of studies have been published on this subject from Chilean bird species (Hinojosa and González-Acuña, 2005). Further, the present study constitutes the first report on the parasitic fauna of Long-tailed Meadowlarks in Chile.

Between January 2005 and December 2008, a total of 27 Long-tailed Meadowlarks were retrieved from different locations within the Biobío Region. Carcasses (resulting from roadkills, poaching, dog kills, etc.) were taken to the Faculty of Veterinary Sciences, Universidad de Concepción, Chillán for parasite examination. Ectoparasites were collected manually with fine forceps after exhaustive examination and preserved in 70% ethanol. They were then cleaned in 20% potassium hydroxide, dehydrated in a series of ethanol solutions (40, 80, and 100%), cleared for 24 h in clover oil, and finally mounted in Canadian balsam (Palma, 1978). Techniques used for the collection, fixation, and staining of endoparasites followed those described in Kinsella and Forrester (1972) and Pritchard and Kruse (1982). Ectoparasites were identified using keys from Price (1977), Cicchino (1984), and Cicchino and Castro (1996) for Phthiraptera and from Park and Atyeo (1971), Mironov and Fain (2003), Valim and Hernandez (2006), Mironov (2008), Mironov et al. (2008), Atyeo and Braasch (1966), and Gaud and Atyeo (1996) for Acari. Endoparasites were identified to species using keys by Rausch and Morgan (1947) and Schmidt and Kuntz (1977). Mean intensity, range, and abundance for each parasite species were calculated as described in Bush et al. (1997). All specimens have been deposited in the Department of Zoology, Universidad de Concepción, Chile.

Table 1 summarizes the parasites found from the 27 Long-tailed Meadowlarks examined. In total, 8 taxa were recovered, 3 species of chewing lice (overall prevalence of 26.6%), 4 species of feather mites (22.2%), 1 cestode, and 1 acanthocephalan (22.2%).

Overall, there was a large variation in the number of ectoparasites recovered from the birds examined, which could be due to the fact that birds were collected after their death. This variation in abundance could also be due to annual and seasonal differences in host and parasite numbers. For some species, it was possible to calculate sex and developmental ratios. For instance, a total of 33 *Brueelia boae* Cicchino and Castro, 1996 were collected, of which 7 were males, 17 were females, and 9 were nymphs (female:male ratio of 2.2 and nymph:adult ratio of 0.37). In *Pterodectes*, a larger number of females (31) than males (20) were collected (ratio of 1.55). In this species, the nymph:adult ratio was 0.1. Finally, in *Harpyrhynchoides*, the sex and developmental stage ratios were 0.83 and 0.5, respectively.

Phthiraptera. The genus *Brueelia* Kéler, 1936 (Ischnocera, Philopteridae) includes approximately 276 species (Cicchino and Castro, 1998b) parasitizing a large number of bird orders including Passeriformes, Piciformes, Coraciiformes, and Trogoniformes (Cicchino and Castro, 1998a). Despite *Brueelia*'s broad host distribution, members of this genus are highly species-specific, with ~ 90% of them infecting only 1 host species (Johnson et al., 2002). Before this study, *B. boae* had only been described from *S. loyca loyca* from Argentina (Santa Rosa, Provincia de

**Table 1.** Summary of ecto and endoparasites found in Long-tailed Meadowlarks *Sturnella loyca* from the Biobio Region, Chile

Parasite	Prevalence (%)	Range intensity	Mean intensity	Mean abundance
Ectoparasites				
Phthiraptera: Ischnocera				
<i>Brueelia boae</i>	26	1 - 26	4.7	1.2
Phthiraptera: Amblycera				
<i>Menacanthus leistidis</i>	7.4	0 - 2	1.5	0.1
<i>Menacanthus sturnellae</i>	7.4	0 - 3	2.0	0.1
Acari: Proctophyllodidae				
<i>Proctophyllodes</i> sp.	3.7	0 - 2	2.0	0.1
<i>Amerodectes</i> sp.	14.8	3 - 35	13.8	2.0
Acari: Psoroptoididae				
<i>Mesalgoides</i> sp.	3.7	0 - 3	3.0	0.1
Acari: Harpyrhynchidae				
<i>Harpyrhynchoides</i> sp.	7.4	4 - 8	8.5	0.06
Endoparasites				
Platyhelminthes:				
Acanthocephala				
<i>Mediorhynchus robustus</i>	3.7	0 - 1	1.0	0.037
Platyhelminthes: Cestoda				
<i>Anonchotaenia longiovata</i>	18	1 - 9	3.0	0.55

La Pampa) (Cicchino and Castro, 1996) and from Chile in individuals sampled from Huilmo (Pumitaqui, Coquimbo, 30°52'59" S, 71°09'05" W) and Llanquihue (41°15'28" S, 73°00'29" W) (González-Acuña et al., 2006). The larger number of female *B. boae* detected in the present study could be due to a potential larger loss of males to predation from the host due to their smaller size and thus higher activity and/or to adverse climatic conditions (Marshall, 1981).

The genus *Menacanthus* Neumann, 1912 (Amblycera: Menoponidae) includes close to 50 species reported from Passeriformes, Piciformes, Apodiformes, Coraciiformes, Tinamiformes, and Galliformes (Cicchino and Castro, 1998b). *Menacanthus leistidis* Cicchino, 1984 was described from Argentina in *Sturnella militaris superciliaris* Bonaparte, 1850 (Cicchino, 1984) and *Sturnella defilipi* (Cicchino and Castro, 1998b). In Chile, this same species had already been described in *S. loyca* from a more northern location (Las Cabras, 34°17'23" S, 71°18'05" W) (González-Acuña et al., 2006). *Menacanthus sturnellae* was originally described by Price (1977) from *S. magna* sampled from different localities in the United States. The present study constitutes the first report of *M. sturnellae* in *S. loyca* and in South America.

Acarina. None of the feather mites found in this study could be identified to species. It is likely they represent undescribed species, but more studies are needed, because material collected was insufficient for identification to species level.

*Proctophyllodes* sp. (Analgoidea: Proctophyllodidae) inhabit primary and secondary wing and tail feathers and are highly adapted to these microhabitats by having enlarged and flattened bodies with well-developed dorsal plates (Mironov et al., 2008). The genus *Proctophyllodes* Robin, 1877 is the most species-rich genus among feather mites and currently includes more than 160 species infecting over 20 Passeriform families world-wide (Atyeo and Braasch, 1966; Kanegae et al., 2008). Although mites of this genus have been reported from birds belonging to the Icteridae family (Černý, 1974), this study gives the first record from *S. loyca*.

As the previous mite, *Amerodectes* sp. (Analgoidea: Proctophyllodidae) inhabits primary and secondary wing and tail feathers. Currently, the genus *Amerodectes* Mironov, 2008 includes 22 described species that infect birds from 9 New World Passeriform families: Cardinalidae, Emberizidae, Furnariidae, Icteridae, Parulidae, Thraupidae, Troglodytidae, Turdidae, and Tyrannidae (Valim and Hernades, 2010; Mironov and González-Acuña, 2011). Because of the high host specificity of these parasites, it is likely that the individuals found in this study belong to a different, yet undescribed species.

*Mesalgoidea* sp. (Analgoidea: Psoroptoididae) inhabits the lower portion of down feathers. A total of 13 *Mesalgoidea* Gaud and Atyeo, 1967 species have been described from Passeriform birds belonging to the families Emberizidae, Fringillidae, Furnariidae, Icteridae, Mimidae, Pipridae, Thraupidae, Turdidae, and Tyrannidae world-wide (Gaud and Atyeo, 1996; Mironov, 2004; Kanegae et al., 2008). Only 2 species of the genus *Mesalgoidea* have been reported previously from icterids of the genus *Ageilais* by Černý (1974).

Mites of the genus *Harpyrhynchoides* Fain, 1972 (Cheyletoidea: Harpyrhynchidae) inhabit the skin of birds and some snakes (Colubridae) and feed on lymph. Thirty-three species infecting 12 orders of birds are known (Fain, 1994; Fain et al., 1999; Bochkov, 2000; Bochkov et al., 2000; Bochkov and Galloway, 2004). This is the first report of this mite in *S. loyca*.

Helminths. The acanthocephalan genus *Mediorhynchus* Van Cleave, 1916 (Gigantorhynchida: Gigantorhynchidae) comprises about 50 species, which are relatively common in Passeriformes world-wide (Schmidt and Kuntz, 1977; Golvan, 1994; Smales, 2002; Smales, 2011). Moya et al. (2011) described *M. peruensis* from *Turdus chiguanco* in Peru and compared it to 4 other species reported from South America. However, the species collected here more closely resembles *M. robustus* Van Cleave, 1916 in total number of hooks and spines, number of rows of hooks and spines, and length of the largest hooks (38 microns). This species was originally described from the intestines of *Icteria virens* in Washington, United States (Van Cleave, 1947). This constitutes the first record of *M. robustus* in Chile and in *S. loyca*.

Similarly to what was found in the present study, the abundance of *Mediorhynchus* is usually very low, with only 1 parasite per host (Van Cleave, 1947). The intermediate hosts for this acanthocephalan are unknown, but cystacanths of *M. robustus* have been reported in Japan from *Nyctereutes procyonoides* (Carnivora: Canidae), which probably represents a dead end host since all known final hosts for this acanthocephalan are Passeriformes (Sato et al., 2006).

*Anochotaenia* Cohn, 1900 (Cyclophyllidea: Paruterinidae) is a cosmopolitan genus of cestodes primarily parasitizing birds of the Order Passeriformes. Schmidt (1986) listed 20 species in the genus and 2 additional species have subsequently been described from India. Species are primarily differentiated by the number and distribution of testes. The species collected here with 8 testes distributed in a continuous group most closely resembles *A. longiovata* (Fuhrmann, 1901), which has previously been reported from the Chilean blackbird, *Curaeus curaeus* (Icteridae) according to Rausch and

Morgan (1947). This is the first record of this helminth in *S. loyca*.

#### Literatura cited

- Araya, M. B. and G. Millie. 2000. Guía de campo de las aves de Chile. Editorial Universitaria, Santiago. 405 p.
- Atyeo, W. T. and N. L. Braasch. 1966. The feather mite genus *Proctophyllodes* (Sarcoptiformes: Proctophyllodidae). Bulletin of the University of Nebraska State Museum 5:1-354.
- Bochkov, A. V. 2000. A new Harpirhynchid mite *Harpyrhynchoides alaudinus* sp.n. (Acari: Harpirhynchidae) from *Arvensis* (Passeriformes: Alaudidae) from Russia. *Acarina* 8:91-93.
- Bochkov, A. and D. Galloway. 2004. New species and records of cheyletoid mites (Acari: Cheyletoidea) from birds in Canada. *Journal of the Kansas Entomological Society* 77:26-44
- Bochkov, A. V., S. V. Mironov and A. Fain. 2000. Phylogeny and host-parasite relationships of the mite family Harpirhynchidae (Acari, Prostigmata). *Acarina* 7:69-87.
- Bush, A. O., K. D. Lafferty, J. M. Lotz and A. W. Shostak. 1997. Parasitology meets ecology on its own terms: Margolis et al., revisited. *Journal of Parasitology* 83:575-583.
- Černý, V. 1974. Parasitic mites of Surinam XXXI. New species of Proctophyllodidae (Sarcoptiformes, Analgoidea). *Folia Parasitologica* 21:349-361.
- Cicchino, A. 1984. Una nueva especie del género *Menacanthus* Neumann (Mallophaga, Menoponidae) parásita de *Sturnella militaris superciliaris* (Bonaparte, 1858) (Aves, Passeriformes, Emberizidae, Icterinae). *Revista de la Sociedad Entomológica Argentina* 43:327-328.
- Cicchino, A. and C. Castro. 1998a. Ischnocera. In *Biodiversidad de artrópodos argentinos*, J. J. Morrone and S. Coscarón (eds.). Buenos Aires. p. 104-124.
- Cicchino, A. and C. Castro. 1998b. Amblycera. In *Biodiversidad de artrópodos argentinos*, J. J. Morrone and S. Coscarón (eds.). Buenos Aires. p. 84-104.
- Cicchino, A. and C. Castro. 1996. Revisión preliminar de las especies del género *Brueelia* Kéler, 1936 (Phthiraptera, Philopteridae) parásitas de Icterinae (Aves, Passeriformes, Fringillidae). *Graellsia* 52:3-30.
- Couve, E. and C. Vidal. 2003. Aves de Patagonia, Tierra del Fuego y península Antártica, islas Malvinas y Georgia del Sur. Editorial Fantástico Sur Birding Ltda. Punta Arenas. 656 p.
- De la Peña, M. R. and M. Rumboll. 1998. *Birds of Southern South America and Antarctica*. Harper Collins Publishers Ltd., London. 304 p.
- Estades, C. F. 1995. Aves y vegetación urbana: el caso de las plazas. *Boletín Chileno de Ornitología* 2:7-13.
- Fain, A. 1994. New observations on the Harpirhynchidae Dubinin, 1957 (Acari: Prostigmata). I. The subgenus *Harpirhynchus* (*Harpyrhynchoides*) Fain, 1972. *Bulletin de la Societe Royale Belge d'Entomologie* 64:109-144.
- Fain, A., A. V. Bochkov and S. V. Mironov. 1999. A contribution to the systematics of the mite family Harpirhynchidae (Acari: Cheyletidae). *Acarologia* 1:37-54.
- Figueiroa, M., J. Bianque, M. Dowell, A. Soares, V. Santiago, R. Alves and A. Evencio. 2002. Parásitos gastrointestinales de aves silvestres en cautiverio en el estado de Pernambuco, Brasil. *Parasitología Latinoamericana* 57:50-54.
- Gaud, J. and W. T. Atyeo. 1996. Feather mites of the world (Acarina, Astigmata): the supraspecific taxa. Part. I. *Annales Musee Royal L'Afrique Centrale Sciences Zoologiques Tervuren* 277:1-187.
- Golvan, Y. 1994. Nomenclature of the Acanthocephala. *Research and Reviews in Parasitology*. 54:135-205
- González-Acuña, D., F. Vergara, L. Moreno, C. Barrientos, K. Ardiles and A. Cicchino. 2006. Lice (Insecta: Phthiraptera) from species of the families Furnariidae, Tyraniidae, Turdidae, and Icteridae (Aves: Passeriformes) from Chile. *Gayana* 70:210-219.
- Goodall, J. D., A. W. Johnson and K. A. Phillipi. 1957. Las aves de Chile: su conocimiento y sus costumbres. Tomo I. *Platt Establecimientos Gráficos*. Buenos Aires, Argentina. 441 p.
- Hinojosa-Sáez, A. and D. González-Acuña. 2005. Estado actual del conocimiento de helmintos en aves silvestres de Chile. *Gayana* 69:241-253.
- Johnson, K. P., R. J. Adams and D. H. Clayton. 2002. The phylogeny of the louse genus *Brueelia* does not reflect host phylogeny. *Biological Journal of the Linnean Society* 77:233-247.
- Kanegae, M. F., M. P. Valim, M. A. Fonseca, M. Â. Marini and N. M. Serra-Freire. 2008. Ácaros plumícolas (Acari: Astigmata) em aves do Cerrado do Distrito Federal, Brasil. *Biota Neotropica* 8:30-38.
- Kinsella, J. M. and D. J. Forrester. 1972. Helminth parasites of the Florida duck, *Anas platyrhynchos fulvipula*. *Proceedings of the Helminthological Society of Washington* 39:173-176.
- Marshall, A. G. 1981. *The ecology of ectoparasitic insects*. Academic Press Inc. London. 459 p.
- Mironov, S. V. and A. Fain. 2003. New species of the feather mite subfamily Pterodectinae (Astigmata: Proctophyllodidae) from African passerines (Aves: Passeriformes). *Bulletin de la Societé Royale Belge d'Entomologie* 139:75-91.
- Mironov, S. V. 2004. Taxonomic notes on four genera of the feather mite subfamily Pandalurinae (Astigmata: Psoroptoididae). *Acarina* 12:3-16
- Mironov, S. V. 2008. New feather mites of the subfamily Pterodectinae (Astigmata: Proctophyllodidae) from passerines (Aves: Passeriformes) in Africa. *Annales Zoologici* 58:403-418.
- Mironov, S. V. and D. González-Acuña. 2011. New feather mites of the subfamily Pterodectinae (Astigmata: Proctophyllodidae) from passerines (Aves: Passeriformes) from Chile and Cuba. *Zootaxa* 2037:1-48.
- Mironov, S. V., I. Literak and M. Čapek. 2008. New feather mites of the subfamily Pterodectinae (Acari: Astigmata: Proctophyllodidae) from passerines (Aves: Passeriformes) in Mato Grosso do Sul, Brazil. *Zootaxa* 1947:1-38.
- Moya, R., R. Martínez and M. Tantaleán. Nueva especie de

- Mediorhynchus* (Acanthocephala, Gigantorhynchidae) en *Turdus chiguanco* (Turdidae) de Junín, Perú. *Revista Peruana de Biología* 18:299-302.
- Palma, R. 1978. Slide-mounting of lice: A detailed description of the Canada balsam technique. *New Zealand Entomologist* 6:432-436.
- Park, C. K. and W. T. Atyeo. 1971. A generic revision of the Pterodectinae, a new subfamily of feather mites (Sarcoptiformes: Analgoidea). *Bulletin of the University of Nebraska State Museum* 9:39-88.
- Price, R. D. F. 1977. The *Menacanthus* (Mallophaga: Menoponidae) of the Passeriformes (Aves). *Journal of Medical Entomology* 14:207-220.
- Pritchard, M. H. and G. O. Kruse. 1982. The collection and preservation of animal parasites. University of Nebraska Press, Lincoln. 141 p.
- Rausch, R. and B. B. Morgan. 1947. The genus *Anonchotaenia* (Cestoda:Dilepididae) from North American birds, with the description of a new species. *Transactions of the American Microscopic Society* 66:203-211.
- SAG (Servicio Agrícola y Ganadero). 2007. La ley de Caza y su reglamento. Servicio Agrícola y Ganadero, Departamento de Protección de los Recursos Renovables, Santiago, Chile. 98 p.
- Sato, H., K. Suzuki and M. Aoki. 2006. Juvenile bird acanthocephalans recovered incidentally from raccoon dogs (*Nyctereutes procyonoides viverrinus*) on Yakushima Island, Japan. *The Journal of Veterinary Medical Science* 68:689-692.
- Schmidt, G. D. and R. E. Kuntz. 1977. Revision of *Mediorhynchus* Van Cleave 1916 (Acanthocephala) with a key to species. *Journal of Parasitology* 63:500-507.
- Smales, L. R. 2002. Species of *Mediorhynchus* (Acanthocephala: Gigantorhynchidae) in Australian birds with the description of *Mediorhynchus colluricinclae* n. sp. *Journal of Parasitology* 88:375-381.
- Smales, L. R. 2011. Gigantorhynchidae (Acanthocephala) including the description of new species of *Mediorhynchus* from birds from the Côte d'Ivoire, Africa. *Comparative Parasitology* 78:316-326.
- Urquiza, A. and J. Mella. 2002. Riqueza y diversidad de aves en parques de Santiago durante el período estival. *Boletín Chileno de Ornitología* 9:12-21.
- Valim, M. P. and F. A. Hernandez. 2006. Redescriptions of four species of the feather mite genus *Pterodectes* Robin, 1877 (Acari: Proctophyllodidae: Pterodectinae) redescribed by Herbert F. Berla. *Acarina* 14:41-55.
- Valim, M. P. and F. A. Hernandez. 2010. A systematic review of feather mites of the genus *Pterodectes* complex (Acari: Proctophyllodidae: Pterodectinae) with redescriptions of species described by Vladimir Černý. *Acarina* 18:3-35.
- Van Clave, H. J. 1947. The acanthocephalan genus *Mediorhynchus*: its history and review of the species occurring in the United States. *Journal of Parasitology* 33:297-315.