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Source: *Revue suisse de Zoologie*, 129(1) : 59-83

Published By: Muséum d'histoire naturelle, Genève

URL: <https://doi.org/10.35929/RSZ.0062>

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## A checklist of the parasitic nematodes of freshwater fishes from Argentina

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**Abstract:** An annotated checklist of the nematode parasites of Argentinian freshwater fishes is presented. This review includes information for 42 taxa of parasitic nematodes from 56 species of freshwater fish hosts. Fourty nematode species have been reported as adults and two as larvae. Camallanidae was the nematode family with the highest number of taxa (12 species), followed by Cucullanidae (4 species) and Raphidascarididae (4 species and 1 at genus level). The larval nematode *Contraecaecum* sp. was the parasite with the widest range of host species, follow by *Spirocamallanus hilarii*, *Spirocamallanus inopinatus*, and *Camallanus corderoi*. Of the 570 species of freshwater fishes reported in Argentina, only 65 (11.4 %) were recorded as hosts of nematodes. Most records were in Characiformes, Siluriformes and Galaxiiformes, which may reflects sampling effort, since its abundance and widely distributions across differents ichthyogeographic provinces of Argentina. Most sampling were done in Great River and Patagonian ichthyogeographic provinces. The small number of examined fish hosts and geographically biased studies may not reflect the real richness and distribution of these parasites. Other obstacles that also contributes to the lack of completeness of this checklist are the problems in the taxonomic validity of some nematode species, doubtful host identification, and poor taxonomic resolution for larval stages of nematodes. Therefore, it is strongly recommended to deposit voucher specimens, including also of the hosts in reference collection, as well as performing integrative studies to elucidate the real taxonomic identity of nematode larvae. This is the first compilation on the nematode parasites of freshwater fishes from Argentina, including three nematode taxa recorded for new host records and four from new localities. Despite this study is exhaustive, the knowledge about parasitic nematodes from Argentinian freshwater fishes is far from complete, since some hydrological basin mainly in Pampean and Andean Cuyan regions and some host families remain unexplored in terms of nematode parasite detection.

**Keywords:** Nematoda - parasite - freshwater fishes - new hosts - new geographical localities - Neotropical region.

### INTRODUCTION

The class Nematoda represents a taxonomical, ecological and geographically diverse helminth assemblage (Luque *et al.*, 2011). To date, nematode biodiversity (parasitic and free living forms) has been estimated at 25 043 species, thus representing the fourth species-rich taxa within the kingdom Animalia (Zhang, 2013). Nematodes represent a conspicuous component of the parasite assemblages in fishes and have a considerable importance from veterinary medicine and public health points of view (Moravec, 1998; Luque *et al.*, 2011). According to Luque *et al.* (2016), nematodes are the fourth taxon in terms of species reported in fishes from Southamerica, after Monogenea, Trematoda, and Cestoda.

Research on freshwater fish nematodes from Argentina date back to mid 20th Century. The first publication was by Shuurmans-Stekhoven (1951), who reported larvae of *Contraecaecum* sp. in *Pseudoplatystoma corruscans* (Spix & Agassiz) (= *Platystoma* sp.) in the Paraná River, Corrientes Province. Subsequently, Zeiss & Seigneur (1981) reported *Contraecaecum rudolphii* Hartwich, 1964 in *Pimelodus albicans* (Valenciennes) and *Salminus brasiliensis* (Cuvier) from Los Quirogas Dam, Santiago del Estero Province. Later Hamann (1982a, b, c, 1984, 1985, 1986, 1995/1996) performed several taxonomic studies about nematode parasites of freshwater fishes from Paraná River basin, contributing to knowledge about the parasitic nematodes of Argentinian freshwater

fishes. From 1995 to today, the number of descriptions and/or reports have considerably increased (e.g., Ramallo & Torres 1995; Ramallo, 1997, 1999, 2008, 2011, 2012; Brugni & Viozzi, 1999, 2003, 2010; Ailán-Choke *et al.*, 2014, 2017, 2018). Chemes & Takemoto (2011) published a commented list of helminth parasites of freshwater fishes from Middle Paraná System, and Rauque *et al.* (2018) included records of nematode parasites in a study about helminth parasites of alien freshwater fishes in Patagonia. However, an actualized checklist about nematode parasites of Argentinian freshwater fish has not yet been published. Therefore, the knowledge about the nematode parasites of Argentinian freshwater fishes is scattered and the studies are focused mainly on taxonomy.

The aim of this study is to update the list of nematode parasites of freshwater fishes from Argentina. It is based on the compilation of published papers and reports of species herein cited for the first time.

## MATERIAL AND METHODS

We compiled and reviewed all publications referring to nematode parasites of Argentinean freshwater fishes (estuarine excluded), during 1951-2021. The bibliographic search was complemented by the information gathered from Host-Parasite Database of the Natural History Museum, London (Gibson *et al.*, 2005), Google Scholar, ScienceDirect and Web of Knowledge. We used the following keywords: Biodiversity, nematodes, parasites, freshwater fishes, Argentina, Parana River basin, Juramento River basin, Bermejo River basin, Colorado River, and Patagonia. Each taxonomic category of Nematoda is presented in alphabetical order, each one followed by author and publication year, and synonyms under which the original records appeared. The list also includes host(s) and localities in which the nematode species was collected (Lo), the geographical coordinates indicated in the publications, the site of infection (SI); the institution where the material is deposited and the accession numbers (MD); developmental stage (DS), references and remarks (when justified).

The taxonomy of nematodes follows Moravec (1998), Anderson *et al.* (2009), and Ailán-Choke & Pereira (2021) for camallanids. Collection acronyms, whenever possible, are as follows: In Argentina: CH-N-FML: Colección de Invertebrados (Sección Helmintos y Anélidos), Fundación Miguel Lillo, San Miguel de Tucumán; ECOAL: Centro de Ecología Aplicada, Corrientes; UNSa-IEBI-I: Colección de Invertebrados del Instituto para el Estudio de la Biodiversidad de Invertebrados, Universidad Nacional de Salta, Salta; CHMLP: Colección de Helminología del Museo de La Plata, La Plata; MACN-Pa: Colección Nacional de Parasitología, Museo Argentino de Ciencias Naturales Bernardino Rivadavia; UNCo-Pa: Colección Parasitológica de la Universidad

Nacional del Comahue, Bariloche; Colección del Museo Provincial de Ciencias Naturales Florentino Ameghino, Santa Fé, Argentina. In other countries: USNPC: U.S. National Parasite Collection, Beltsville, Maryland; IPCAS Helm.: Helminthology Collection, Institute of Parasitology, Academy of Sciences of the Czech Republic, České Budějovice; NHM: The Natural History Museum, London; CHIOC: Helminthological Collection of the Instituto Oswaldo Cruz, Rio de Janeiro, Brazil; IPUAT: Instituto de Parasitología de la Universidad Austral de Chile.

The fish taxonomy follows Mirande & Koerber (2015), Lucena & Gouvea Soares (2016), Mirande & Koerber (2020), Terán *et al.* (2020), Fricke *et al.* (2021), and Froese & Pauly (2021). The names of ichthyogeographic provinces follow López *et al.* (2008). Type material is indicated with H (Holotype), A (Allotype), and P (Paratype) after the collection acronym. The following abbreviations and symbols are used: \*new host record by the present authors, \*\*new locality record by the present authors, ● indicates doubtful fish host; ◦ indicates doubtful record of parasite.

## RESULTS

The parasite-host list comprises records of 42 taxa of nematode parasites (36 nominal species and 6 identified at generic level), belonging to 3 orders and 12 families. These parasites were associated with 56 species of freshwater fishes from 9 orders and 21 families (Table 1). Fourty nematode taxa were reported as adults and two unidentified species as larvae (*Contracaecum* sp. and *Eustrongylides* sp.). In the particular case of *Hysterothylacium* sp., it was recorded as larvae only in *Odontesthes bonariensis* (Valenciennes), while in the other fish hosts [*Odontesthes hatcheri* (Eigenmann) and *Percichthys trucha* (Valenciennes)] was recorded as adult. Camallanidae was the family with the highest number of species recorded (12), followed by Cucullanidae (4) and Raphidascarididae (4), whereas Guyanemidae and Philometridae are only represented by one species each. The larval nematode *Contracaecum* sp. was the parasite with the widest range of host species, parasitizing 28 fish species, follow by *Spirocamallanus hilarii* Vaz & Pereira, 1934 reported in 15 fish species, *S. inopinatus* Travassos, Artigas & Pereira, 1928 and *Camallanus corderoi* Torres, Teuber & Miranda, 1990; both in 10 fish species (see Table 1). Additionally, we reported new hosts for three taxa [*Spirocamallanus hilarii*, *Rhabdochona acuminata* (Molin, 1860) and *Contracaecum* sp.] and four nematodes were recorded in new localities [*Cucullanus (Cucullanus) pinnai pinnai* Travassos, Artigas & Pereira, 1928, *Spirocamallanus hilarii*, *Rhabdochona acuminata* and *Contracaecum* sp. in the present survey (see the Parasite-Host list)].

Fish orders with the highest number of nematode

Table 1. List of the Argentinian fish hosts and their nematodes (host species are presented by order and families in alphabetical order).  
\* Doubtful identification of host species. ° Doubtful identification of nematode.

Orders	Families	Hosts	Nematodes
Atheriniformes	Atherinopsidae	<i>Odontesthes bonariensis</i>	<i>Camallanus corderoi</i> <i>Contracaecum</i> sp. <i>Goezia</i> sp. °
		<i>Odontesthes hatcheri</i> (syn. <i>Patagonina hatcheri</i> )	<i>Camallanus corderoi</i> <i>Contracaecum</i> sp. <i>Hysterothylacium</i> sp. <i>Hysterothylacium patagonense</i> <i>Rhabdochona</i> sp. <i>Rhabdochona acuminata</i>
Characiformes	Anostomidae	<i>Megaleporinus obtusidens</i> (syn. <i>Leporinus obtusidens</i> )	<i>Spinitectus asperus</i> <i>Spirocamallanus hilarii</i> <i>Spirocamallanus inopinatus</i>
		<i>Leporinus maculatus</i> *	<i>Spirocamallanus inopinatus</i>
	Bryconidae	<i>Brycon orbignyianus</i>	<i>Spirocamallanus inopinatus</i>
		<i>Salminus brasiliensis</i>	<i>Contracaecum</i> sp. <i>Contracaecum rudolphii</i> ° <i>Neocucullanus marcelae</i> <i>Spirocamallanus hilarii</i>
	Characidae	<i>Astyanax abramis</i>	<i>Spirocamallanus hilarii</i>
		<i>Astyanax bimaculatus</i> *	<i>Spirocamallanus hilarii</i> <i>Contracaecum</i> sp. <i>Rhabdochona acuminata</i>
		<i>Bryconamericus iheringi</i>	<i>Rhabdochona fabianae</i>
		<i>Piabina thomasi</i> (syn. <i>Bryconamericus thomasi</i> )	<i>Contracaecum</i> sp. <i>Spirocamallanus hilarii</i>
		<i>Oligosarcus jenynsii</i>	<i>Contracaecum</i> sp. <i>Hedruris bifida</i> <i>Spirocamallanus hilarii</i>
		<i>Poptella paraguayensis</i> (syn. <i>Ephippicharax orbicularis paraguayensis</i> )	<i>Spirocamallanus inopinatus</i>
		<i>Psalidodon anisitsi</i> (syn. <i>Hyphessobrycon anisitsi</i> )	<i>Spirocamallanus hilarii</i>
		<i>Psalidodon eigenmanniorum</i> (syn. <i>Astyanax eigenmanniorum</i> )	<i>Contracaecum</i> sp. <i>Spirocamallanus hilarii</i>
		<i>Psalidodon endy</i> (syn. <i>Astyanax endy</i> )	<i>Contracaecum</i> sp. <i>Spirocamallanus hilarii</i>
		<i>Psalidodon rutilus</i> (syn. <i>Astyanax fasciatus</i> )	<i>Spirocamallanus hilarii</i>
	Erythrinidae	<i>Hoplias argentinensis</i>	<i>Contracaecum</i> sp.
		<i>Hoplias misionera</i>	<i>Contracaecum</i> sp. <i>Spirocamallanus hilarii</i> <i>Spirocamallanus inopinatus</i> <i>Spirocamallanus tomsici</i>
	Gasteropelecidae	<i>Thoracocharax stellatus</i>	<i>Procamallanus (Denticamallanus) ana</i>
	Prochilodontidae	<i>Prochilodus lineatus</i> (syn. <i>P. platensis</i> )	<i>Spinitectus asperus</i>
	Serrasalminae	<i>Piaractus mesopotamicus</i> (syn. <i>Colossoma mitrei</i> )	<i>Rondonia rondoni</i> <i>Spectatus spectatus</i>
		<i>Serrasalmus marginatus</i>	<i>Spirocamallanus inopinatus</i>
		<i>Serrasalmus spilopleura</i> *	<i>Contracaecum</i> sp. <i>Spirocamallanus inopinatus</i>
		<i>Pygocentrus nattereri</i> (syn. <i>Serrasalmus nattereri</i> )	<i>Contracaecum</i> sp. <i>Spirocamallanus inopinatus</i> <i>Spirocamallanus tomsici</i>

Orders	Families	Hosts	Nematodes
Cypriniformes	Cyprinidae	<i>Cyprinus carpio</i>	<i>Contracaecum</i> sp.
Cyprinodontiformes	Anablepidae	<i>Jenynsia alternimaculata</i>	<i>Contracaecum</i> sp. <i>Cucullanus (Cucullanus) pinnai pinnai</i> <i>Spirocamallanus hilarii</i> <i>Rhabdochona acuminata</i>
		<i>Lebias multidentata</i> (syn. <i>Jenynsia multidentata</i> )	<i>Rhabdochona acuminata</i> <i>Camallanus corderoi</i>
		<i>Jenynsia obscura</i>	<i>Contracaecum</i> sp.
Galaxiiformes	Galaxiidae	<i>Galaxias maculatus</i>	<i>Camallanus corderoi</i> <i>Contracaecum</i> sp. <i>Eustrongylides</i> sp. <i>Eustrongylides tubifex</i> <i>Hedruris</i> sp. <i>Hedruris suttonae</i> <i>Hysterothylacium patagonense</i> <i>Placonema pataguense</i> <i>Rhabdochona acuminata</i>
		<i>Galaxias platei</i>	<i>Ascarophis patagonica</i> <i>Camallanus corderoi</i> <i>Contracaecum</i> sp. <i>Hedruris</i> sp. <i>Hedruris suttonae</i> <i>Rhabdochona</i> sp. <i>Rhabdochona acuminata</i>
Centrarchiformes	Percichthyidae	<i>Percichthys colhuapiensis</i>	<i>Camallanus tridentatus</i> °
		<i>Percichthys trucha</i>	<i>Camallanus corderoi</i> <i>Camallanus tridentatus</i> ° <i>Contracaecum</i> sp. <i>Hedruris</i> sp. <i>Hysterothylacium</i> sp. <i>Hysterothylacium patagonense</i> <i>Philonema percichthydis</i> <i>Pseudodelphis limnicola</i> <i>Rhabdochona</i> sp. <i>Rhabdochona acuminata</i>
Perciformes	Sciaenidae	<i>Pogonias cromis</i>	<i>Dichelyne (Cucullanellus) mariajuliae</i>
Salmoniformes	Salmonidae	<i>Oncorhynchus mikiss</i>	<i>Camallanus corderoi</i> <i>Camallanus tridentatus</i> ° <i>Contracaecum</i> sp. <i>Goezia</i> sp. ° <i>Hedruris</i> sp. <i>Hedruris suttonae</i> <i>Rhabdochona</i> sp. <i>Rhabdochona acuminata</i> <i>Hysterothylacium patagonense</i>
		<i>Salmo trutta</i>	<i>Camallanus corderoi</i> <i>Contracaecum</i> sp. <i>Hedruris</i> sp. <i>Hedruris suttonae</i> <i>Hysterothylacium patagonense</i>
		<i>Salmo salar</i>	<i>Camallanus corderoi</i> <i>Contracaecum</i> sp.
		<i>Salvelinus fontinalis</i>	<i>Camallanus tridentatus</i> ° <i>Camallanus corderoi</i> <i>Contracaecum</i> sp. <i>Hedruris suttonae</i> <i>Hysterothylacium patagonense</i>

Orders	Families	Hosts	Nematodes	
Siluriformes	Diplomystidae	<i>Olivaichthys viedmensis</i>	<i>Contracaecum</i> sp.	
		<i>Olivaichthys mesembrinus</i> (syn. <i>Diplomystes mesembrinus</i> )	<i>Rhabdochona acuminata</i>	
	Callichthyidae	<i>Corydoras paleatus</i>	<i>Spirocamallanus pinto</i>	
		<i>Corydoras micracanthus</i>	<i>Spirocamallanus pinto</i>	
	Doradidae	<i>Pterodoras granulosus</i>	<i>Klossinemella iheringi</i> <i>Rondonia rondoni</i> <i>Spectatus spectatus</i>	
	Heptapteridae	<i>Heptapterus mustelinus</i>	<i>Cucullanus (Cucullanus) pinnai pinnai</i>	
		<i>Pimelodella gracilis</i>	<i>Spirocamallanus juana</i>	
		<i>Rhamdia quelen</i>	<i>Contracaecum</i> sp.	
		<i>Rhamdia sapo</i>	<i>Hysterothylacium rhamdiae</i>	
	Loricariidae	<i>Rineloricaria steinbachi</i> (syn. <i>Loricaria steinbachi</i> )	<i>Raphidascaris (Sprentascaris) saltaensis</i>	
		<i>Hypostomus cordovae</i>	<i>Raphidascaris (Sprentascaris) marano</i>	
	Pimelodidae	<i>Luciopimelodus pati</i>	<i>Cucullanus (Cucullanus) pinnai pinnai</i> <i>Spirocamallanus inopinatus</i>	
		<i>Pimelodus albicans</i>	<i>Contracaecum</i> sp. <i>Contracaecum rudolphii</i> ° <i>Cucullanus (Cucullanus) pinnai pinnai</i> <i>Spinitectus asperus</i> <i>Spirocamallanus hilarii</i> <i>Spirocamallanus juana</i> <i>Spirocamallanus rarus</i> <i>Spirocamallanus tomsici</i>	
		<i>Pimelodus maculatus</i> (syn. <i>Pimelodus clarias maculatus</i> )	<i>Cucullanus (Cucullanus) pinnai pinnai</i> <i>Spirocamallanus inopinatus</i> <i>Spirocamallanus neocaballeroi</i> <i>Spirocamallanus pimelodus</i>	
		<i>Pseudoplatystoma corruscans</i>	<i>Contracaecum</i> sp. <i>Cucullanus (Cucullanus) pinnai pinnai</i> <i>Goezia spinulosa</i> <i>Spirocamallanus inopinatus</i>	
		<i>Sorubim lima</i>	<i>Contracaecum</i> sp.	
		<i>Zungaro zungaro</i> (syn. <i>Paulicea luetkeni</i> )*	<i>Cucullanus paulicea</i>	
		Trichomycteridae	<i>Hatcheria macraei</i> (syn. <i>Trichomycterus macraei</i> )	<i>Rhabdochona acuminata</i>
			<i>Trichomycterus corduvensis</i>	<i>Spirocamallanus huacraensis</i>
			<i>Trichomycterus spegazzinii</i>	<i>Contracaecum</i> sp. <i>Cucullanus (Cucullanus) pinnai pinnai</i> <i>Spirocamallanus hilarii</i> <i>Spirocamallanus huacraensis</i> <i>Spirocamallanus pinto</i> <i>Rhabdochona acuminata</i>

taxa were Siluriformes (32), Characiformes (24), and Galaxiiformes (11). Among Siluriformes, pimelodids present the highest number of nematode taxa recorded, *Pimelodus albicans* (Valenciennes) with eight taxa recorded, followed by *P. maculatus* Lacépède, and *Pseudoplatystoma corruscans* (Spix & Agassiz) (four each) (see Table 1). *Trichomycterus spegazzini* (Berg) (Siluriformes) has six nematode taxa recorded. Among Galaxiiformes, *Galaxias maculatus* (Jenyns) with nine taxa and *G. platei* Steindachner with eight taxa (see Table 1). In the case of Characiformes, the bryconid *Salminus brasiliensis* presents four taxa, the characids *Astyanax lacustris* (Luetken) and *Oligosarcus jenynsii* (Günther) has three taxa each one.

Most records of nematode parasite in freshwater fishes were from Great River ichthyogeographic province, especially in Salta and Corrientes provinces with 35 and 23 records of host-nematode parasite associations, respectively; and Patagonian ichthyogeographic provinces, represented mainly by studies carried out in Río Negro province with 36 records of host-nematode parasite associations. The remaining ichthyological provinces present few records or none like in the Andean-Cuyan region.

#### PARASITE-HOST LIST

**Class Nematoda**  
**Subclass Adenophorea**  
**Order Enoplida**  
**Superfamily Dioctophymatoidea**  
**Family Dioctophymatidae**  
**Genus *Eustrongylides* Jagerskiöld, 1909**  
***Eustrongylides* sp.**

Host *Galaxias maculatus* (Jenyns)  
 SI: Caudal peduncle. Lo: Gutierrez Lake (41°12'S, 71°26'W) (Brugni & Viozzi, 1999) and (41°10'S, 71°24'W) (Guagliardo *et al.*, 2019), Moreno Lake (41°04'S, 71°33'W) and Quillén Lake (39°25'S, 71°20'W) (Brugni & Viozzi, 2003), all Río Negro Province. MD: Not indicated. DS: Third and four-stage larvae were found inside melanized capsules. Remark: The larvae have always been found in conspicuous, external, and strongly melanized cysts on the caudal peduncle of *G. maculatus* (Brugni & Viozzi, 1999, 2003). Moravec (1998) mentioned that the species identification of *Eustrongylides* larvae is problematic and that the only reliable way to determine the species is to obtain adult nematodes from experimental infections to the definitive host (piscivorous bird).

***Eustrongylides tubifex* (Nitzsch, 1819)**

Host *Galaxias maculatus* (Jenyns)  
 SI: Caudal peduncle. Lo: Moreno Lake and Quillén Lake, Río Negro Province. MD: Not reported. DS: Third stage

larvae inside melanized capsules. Reference: Brugni & Viozzi (2003). SI: Caudal peduncle. Lo: Carilafquén, Neuquén Province. MD: MACN-Pa # 467 DS: Larvae. Reference: Viozzi *et al.* (2009).

**Subclass Secernentea**  
**Order Ascaridida**  
**Superfamily Ascaridoidea**  
**Family Anisakidae**  
**Genus *Contraecum* Railliet & Henry, 1912**

Synonyms: *Kathleena* Leiper & Atkinson, 1914; *Amphicaecum* Walton, 1927; *Cerascaris* Cobb, 1929; *Contraecum* (*Ornitocaecum*) Mozgovi, 1951; *Contraecum* (*Synthetonema*) Kreis, 1952.

***Contraecum* sp.**

Host *Astyanax lacustris* (Luetken)  
 SI: Corporal cavity. Lo: El Tunal Reservoir (25°15'S, 64°25'W), Salta Province. MD: Not indicated. DS: Larvae. Reference: Cancino & Ramallo (2008). SI: Corporal cavity. Lo: Itaú River (22°20'S, 64°05'W), Salta Province. MD: CH-N-FML# 7481. DS: Larvae. Reference: Antelo *et al.* (2016).

Host *Cyprinus carpio* Linnaeus  
 SI: corporal cavity. Lo: Casa de Piedra Reservoir (38°10'S, 67°09'W) and downstream Ballester Dam (38°43.9'S, 68°10'W), Colorado River; Herradura Backwater (38°57.44'S, 68°10.5'W); China Muerta Town (38°59.5'S, 68°19'W) and downstream Arroyito Dam (39°04.5'S, 68°33'W), Limay River; Allen City (39°02'S, 67°50'W) and Guardia Mitre Town (40°26.5'S, 63°41'W), Negro River; all Río Negro Province. MD: not indicated. DS: Larvae. Reference: Rauque *et al.* (2018). SI: Liver and visceral fat. Lo: Ingeniero Ballester dam (38°43'S, 68°10'W), Río Negro Province. MD: MACN-Pa # 562/1. DS: Larvae. Reference: Waicheim *et al.* (2014).

Host *Galaxias maculatus* (Jenyns)  
 SI: Corporal cavity, gonads. Lo: Moreno (41°05'S, 71°35'W) and Escondido (39°09'S, 71°17'W) Lakes, Río Negro Province. MD: Not indicated. DS: Larvae. Reference: Ortubay *et al.* (1994). SI: Abdominal cavity. Lo: Lakes Ñorquinco (39°09'S, 71°17'W); Quillén (39°25'S, 71°20'W); Huechulafquén (39°45'S; 71°25'W); Lácar (40°10'S; 71°30'W); Machónico (40°20'S, 71°33'W); Meliquina (40°23'S, 71°17'W); Filo Hua Hum (40°30'S, 71°17'W); Villarino (40°28'S, 71°35'W), Espejo Chico (40°35'S, 71°44'W); Traful (40°37'S, 71°25'W); Bailey Willis (40°38'S, 71°40'W); Espejo (40°41'S, 71°40'W) Correntoso (40°44'S, 71°39'W); Patagua (40°47'S, 71°37'W); Verde (40°46'S, 71°39'W); Nahuel Huapi (40°48'S, 71°39'W); El Trébol (41°04'S, 71°30'W); Morenito (41°05'S, 71°31'W); Escondido (41°05'S,

71°35'W); Mallín Ingeniero (41°15'S, 71°40'W); Llum (41°16'S, 71°40'W); Mascardi (41°17'S, 71°38'W); Fonck (41°18'S, 71°43'W); Hess (41°22'S, 71°43'W), Los Césares (41°19'S, 71°43'W); Verde (Villa Mascardi) (41°20'S, 71°31'W); Roca (41°21'S, 71°25'W); Los Moscos (41°21'S, 71°36'W); Juventus (41°22'S, 71°31'W); Huala Hue (41°25'S, 71°30'W); Steffen (41°31'S, 71°33'W); Rivers: Caleufu (40°30'S, 71°17'W), Ñirihuau (41°06'S, 71°10'W), Santa Cruz (50°00'S, 69°00'W), and Senillosa Channel (Limay River) (38°50'S, 68°30'W), Lakes. Patagonia. MD: MACN-Pa 464. DS: Larvae. References: Viozzi *et al.* (2009); Fernandez *et al.* (2015).

Host *Galaxias platei*

SI: Liver. Lo: Rosario Lake (43°15'S, 71°30'W), Chubut Province and Pueyrredón Lake (47°16'S, 72°00'W), Santa Cruz Province. MD: Not indicated. DS: Larvae. Reference: Ortubay *et al.* (1994).

Host *Hoplias argentinensis* Rosso *et al.*

SI: Free or encapsulated in abdominal cavity. Lo: Lago 2 (34°02'S, 59°07'W), Buenos Aires Province; Lagoon 2 (34°46'S, 63°38'W) and Lagoon 8 (33°06'S, 63°03'W) Córdoba Province. MD: Not indicated. DS: Third-stage larvae (Type 2). Reference: Mancini *et al.* (2014).

Host *Hoplias misionera* Rosso *et al.*

SI: Free or encapsulated in abdominal cavity, mesenteries. Lo: Pilcomayo River (22°22'S, 62°32'W), Salta Province. MD: CH-N-FML# 7771. DS: Larvae. Reference: Ramallo *et al.* (2020).

Host *Jenynsia alternimaculata* (Fowler) \*\*

SI: Abdominal cavity, mesenteries. Lo: Isasmendi Stream (24°48'S, 65°26'W) and Stream affluent to Yacones River (24°31'S, 65°24'W), Salta Province. MD: CH-N-FML # 7514. DS: Larvae. Reference: Ailán-Choke *et al.* (2014). SI: abdominal cavity, mesenteries. Lo: Yacones River (24°40'S, 65°24'W) and Arias-Arenales River (24°48'S, 65°25'W), Salta Province. MD: UNSa-IEBI-I # 055. DS: Larvae. Reference: Present study. Remarks: New locality records.

Host *Jenynsia obscura* (Weyenbergh)

SI: Abdominal cavity. Lo: Vis-Vis River (27°15'S, 66°35'W) and Agua Fresca Dam (27°16'S, 66°35'W), Catamarca Province. MD: CH-N-FML # 07479. DS: Larvae. Reference: Ramallo & Padilla Bortayro (2011).

Host *Odontesthes bonariensis* (Valenciennes)

SI: Corporal cavity. Lo: lagoon south of the Córdoba Province (34°36'S, 64°24'W). MD: Not indicated. DS: Larvae. Reference: Mancini *et al.* (2005). SI: Corporal cavity. Lo: Shallow lake, Córdoba Province. MD: Not indicated. DS: Larvae. Reference: Mancini *et al.* (2006). SI: Corporal cavity. Lo: La Viña Reservoir, (31°17'S,

65°01'W), Córdoba Province. MD: Not indicated. DS: Larvae. Reference: Mancini *et al.* (2008). SI: Mesentery. Lo: Salada Grande, General Lavalle (36°55'S, 56°58'W) and Lacombe, Lezama (35°49'S, 57°49'W) lagoons, Buenos Aires Province. MD: CHMLP. DS: Larvae (L3). Reference: Drago (2012). SI: Free or encapsulated in abdominal cavity. Lo: Reservoir 3 (31°17'S, 65°01'W), Lake 1 (33°00'S, 63°55'W), Lagoon 3 (33°48'S, 64°51'W), Lagoon 5 (33°30'S, 63°06'W), Lagoon 6 (34°28'S, 64°23'W), Lagoon 7 (33°25'S, 62°53'W), Córdoba Province. MD: Not indicated. DS: Third-stage larvae (Type 2). Reference: Mancini *et al.* (2014). SI: Free or encapsulated in abdominal cavity. Lo: Reservoir 6 (32°48'S, 65°28'W), Lagoon 1 (33°59'S, 65°24'W), San Luis Province. MD: Not indicated. DS: Third-stage larvae (Type 2). Reference: Mancini *et al.* (2014). SI: Abdominal cavity. Lo: La Plata River (34°28'S, 58°23'W); Lacombe Pampaen Lake (35°49'S, 57°53'W); Chascomús pampean Lake (35°37'S, 58°00'W) Buenos Aires Province. MD: CHMLP. DS: Third-stage larvae. Reference: Flores *et al.* (2016). SI: Abdominal cavity. Lo: Casa de Piedra Reservoir (38°10'S, 67°09'W), Colorado River, La Pampa-Río Negro Provinces and Pellegrini Lake (38°41'S, 68°00'W), Neuquén River, Río Negro Province. MD: MACN-Pa. DS: Larvae. Reference: Rauque *et al.* (2018).

Host *Odontesthes hatcheri* (Eigenmann) (syn. *Patagonina hatcheri*)

SI: Intestine. Lo: Moreno Lake (41°06'S, 71°32'W), Río Negro Province; Alicurá Reservoir (40°40'S, 71°00'W), Río Negro-Neuquén Provinces. MD: Not indicated DS: Adults and larvae. Reference: Ortubay *et al.* (1994). SI: Intestine wall. Lo: El Chañar (Neuquén River) (38°34'S, 68°24'W), Calefú River (Limay River) (40°23'S, 70°44'W), Neuquén Province; Carrilafquén Chica Lagoon (41°12'S, 69°25'W); Morenito lake (41°02'S, 68°34'W); Moreno Oeste Lake (41°06'S, 71°32'W), Río Negro Province; Musters (45°25'S, 69°11'W), Chubut Province. MD: CHMLP. DS: Third-stage larvae. Reference: Flores *et al.* (2016).

Host *Oligosarcus jenynsii* (Günther)

SI: Free or encapsulated in abdominal cavity. Lo: Lagoon 2 (34°46'S, 63°38'W), Lagoon 4 (33°09'S, 63°31'W), Lagoon 9 (34°53'S, 63°31'W), Córdoba Province. MD: Not indicated. DS: Third-stage larvae (Type 2). Reference: Mancini *et al.* (2014). SI: Free or encapsulated in abdominal cavity. Lo: Stream (33°45'S, 69°02'W) Mendoza Province. MD: Not indicated. DS: Third-stage larvae (Type 2). Reference: Mancini *et al.* (2014).

Host *Olivaichthys viedmensis* (MacDonagh)

SI: Mesentery, stomach, intestine. Lo: Alicurá Reservoir (40°40'S, 71°00'W), Río Negro-Neuquén Provinces. MD: Not indicated. DS: Larvae. Reference: Ortubay *et al.* (1994).



Host *Oncorhynchus mykiss* (Walbaum)

SI: Corporal cavity. Lo: El Chañar Reservoir (38°34'S, 68°24'W) Neuquén River; Arroyito Reservoir (38°40'S, 68°33'W), Limay River; Ballester Dam (38°43'S, 68°10'W), Neuquén River; Ramos Mexia Reservoir (39°26'S, 68°56'W), Limay River; Piedra del Águila Reservoir (40°19'S, 70°93'W), Limay River; Nahuel Huapi Lake (41°04'S, 71°25'W), Limay River; Moreno Lake (41°04'S, 71°33'W), Limay River, Escondido Lake (41°05'S, 71°35'W), Limay River, Río Negro Province; Traful Lake (40°38'S, 71°24'W), Limay River; Alicurá Reservoir (40°40'S, 71°00'W), Limay River, Neuquén Province; Cholila Lake (42°27'S, 71°40'W), Futaleufú River, Chubut Province. MD: MACN–Pa. DS: Larvae. Reference: Rauque *et al.* (2018).

Host *Percichthys trucha* (Valenciennes)

SI: Intestine. Lo: Alicurá Reservoir (40°40'S, 71°00'W), Río Negro-Neuquén Provinces; Moreno Lake (Río Limay) (41°04'S, 71°33'W), and Escondido Lake (41°05'S, 71°35'W), Río Negro Province. MD: Not indicated. DS: Larvae. Reference: Ortubay *et al.* (1994).

Host *Piabina thomasi* (Fowler) (syn. *Bryconamericus thomasi*) \*\*

SI: Abdominal cavity, mesenteries. Lo: Puerta de Díaz Dam (25°16'S, 65°31'W), Salta Province. MD: UNSa-IEBI-I # 145/1. DS: Larvae. Reference: Párraga & Davies (2015). SI: Abdominal cavity, mesenteries. Lo: Puerta de Díaz Dam (25°16'S, 65°31'W), Salta Province. MD: UNSa-IEBI-I # 0055. DS: Larvae. Reference: Present study. Remarks: New locality record.

Host *Pimelodus albicans* (Valenciennes)

SI: Free or encapsulated in abdominal cavity. Lo: Laguna 2 (35°46'S, 63°38'W), Laguna 7 (33°25'S, 62°53'W), Río Cuarto (33°09'S, 64°16'W), Córdoba Province. MD: Not indicated. DS: Third stage larvae (Type 2). Reference: Mancini *et al.* (2014). SI: Free or encapsulated in abdominal cavity, mesenteries, intestine or liver Lo: Misión La Paz, Pilcomayo River (22°22'S, 62°32'W), Rivadavia Department, Salta Province. MD: CH-N-FML#7772. DS: Third stage larvae (Type 2). Reference: Ramallo *et al.* (2020).

Host *Psalidodon eigenmanniorum* (Cope) (syn. *Astyanax eigenmanniorum*)

SI: Free or encapsulated in abdominal cavity. Lo: Castaño River, San Juan Province. MD: CH-N-FML #07799. DS: Larvae. Reference: Ramallo & Cancino (2021).

Host *Psalidodon endy* (Mirande, Aguilera & Azpelicueta) (syn. *Astyanax endy*) \*\*\*

SI: Abdominal cavity, mesenteries. Lo: Campo Alegre Dam (24°34'S, 65°21'W), Salta Province. MD: UNSa-IEBI-I # 0055. DS: Larvae. Reference: Present study. Remarks: New host and locality records.

Host *Pseudoplatystoma corruscans* (Spix & Agassiz)

SI: Stomach and intestine. Lo: Parana River, Santa Fé Province. MD: CH-N-FML# 212 (missing material). DS: Larvae. Reference: Schuurmans Stekhoven (1951). SI: Free or encapsulated in abdominal cavity, mesenteries. Lo: Pilcomayo River (22°22'S, 62°32'W), Salta Province. MD: CH-N-FML #7769. DS: Larvae. Reference: Ramallo *et al.* (2020).

Host *Pygocentrus nattereri* Kner

SI: Free or encapsulated in abdominal cavity, mesenteries. Lo: Pilcomayo River (22°22'S, 62°32'W) Salta Province. MD: CH-N-FML# 7785. DS: Larvae. Reference: Ramallo *et al.* (2020).

Host *Rhamdia quelen* (Quoy & Gaimard)\*\*

SI: Free or encapsulated in abdominal cavity. Lo: Lake 2, Buenos Aires (34°03'S, 59°07'W), Buenos Aires Province. MD: Not indicated. DS: Third-stage larvae (Type 2). Reference: Mancini *et al.* (2014). SI: Free or encapsulated in abdominal cavity. Laguna 2 (36°46'S, 63°38'W), Lagoon 9 (34°53'S, 63°31'W), Córdoba Province. MD: Not indicated. DS: Third-stage larvae (Type 2). Reference: Mancini *et al.* (2014). SI: Free or encapsulated in abdominal cavity. Lo: El Cero Dam, Figueroa Water System (27°07'S, 63°37'W), Santiago del Estero Province. MD: CH-N-FML # 07787. DS: Third stage larvae (Type 2). Reference: Present study. Remarks: New locality record.

Host *Salminus brasiliensis* (Cuvier)

SI: Intestinal caecum and peritoneum of intestine. Lo: Río Hondo Reservoir (27°31'S, 64°53'W) Tucumán-Santiago del Estero Provinces. MD: CH-FML # 01830 and IPUAT # 0247. DS: Larvae. Reference: Ramallo & Torres (1995).

Host *Salmo salar* Linnaeus

SI: Mesentery, stomach and intestine. Lo: Alicurá Reservoir (40°40'S, 71°00'W), Río Negro-Neuquén Provinces. MD: Not indicated. DS: Larvae. Reference: Ortubay *et al.* (1994). SI: Abdominal cavity. Lo: Piedra del Águila Reservoir (40°19'S, 70°03'W), Limay River, Río Negro-Neuquén Provinces. MD: MD: MACN-Pa. DS: Larvae. Reference: Rauque *et al.* (2018).

Host *Salmo trutta* Linnaeus

SI: Corporal cavity. Lo: Pichi Picún Leufú Reservoir (40°01'S, 70°00'W); Piedra del Águila Reservoir (40°19'S, 70°03'W); Alicurá Reservoir (40°35'S, 70°50'W); Nahuel Huapi Lake (41°05'S, 71°25'W); Moreno Lake (41°04'S, 71°33'W), all Limay River, Río Negro Province. MD: MACN-Pa. DS: Larvae. Reference: Rauque *et al.* (2018).

Host *Salvelinus fontinalis* (Mitchill)

SI: Corporal cavity. Lo: Moreno Lake (41°05'S 71°30'W),

Limay River, Neuquén Province. MD: MACN-Pa. DS: Larvae. Reference: Rauque *et al.* (2018).

Host *Serrasalmus spilopleura* Kner •

SI: Encysted in mesentery, wall of intestine, stomach and pyloric caecum. Lo: Riachuelo basin, Paraná River, Corrientes Province. MD: Not indicated. DS: Larvae. Reference: Hamann (1995/1996, 1999). Remarks: According to Mirande & Koerber (2020), *S. spilopleura* is not distributed in Argentina, but this record could correspond to *Serrasalmus maculatus* Kner (Jégu & Santos, 2001; Mirande & Koerber, 2020).

Host *Sorubim lima* (Bloch & Schneider)

SI: Free or encapsulated in abdominal cavity, mesenteries. Lo: Pilcomayo River (22°22'S, 62°32'W), Salta Province. MD: CH-N-FML# 2767. DS: Larvae. Reference: Ramallo *et al.* (2020).

Host *Trychomycterus spegazzinii* (Berg)

SI: Abdominal cavity, mesenteries. Lo: Stream affluent to Yacones River (24°31'S, 65°24'W), Salta Province. MD: UNSa-IEBI-I #052. DS: Larvae. Reference: Ailán-Choke *et al.* (2014).

***Contracaecum jorgei* Sardella, Mancini, Salinas, Simões & Luque, 2020**

Host *Hoplias argentinensis* Rosso *et al.*

SI: Intestine. Lo: Pampean shallow lakes (33°25'S, 62°54'W), Unión Department, Córdoba Province. MD: (P) CHIOC # 38926. DS: Third stage larvae. Reference: Sardella *et al.* (2020). Remarks: *Contracaecum jorgei* was morphologically described for adults and fourth-stage larvae (L4) found in the bird *Nannopterum brasiliense* and third-stage larvae (L3) found in *H. argentinensis*. Additionally, in the molecular analyses, sequences obtained from adult, L4 and L3 specimens of this parasite were similar and grouped, forming an independent lineage (Sardella *et al.*, 2020).

***Contracaecum rudolphii* Hartwich, 1964**

Synonyms: *Contracaecum spiculigerum* (Rudolphi, 1809); *Ascaris siluriglianidis* Linstow, 1883.

Host *Pimelodus albicans* (Valenciennes) ◦

SI: Mesentery. Lo: Los Quirogas Dam (27°41'S, 64°18'W), Santiago del Estero Province. MD: Not indicated. DS: Larvae. Reference: Zeiss & Seigneur (1981).

Host *Salminus brasiliensis* (Cuvier) ◦

SI: mesentery. Lo: Los Quirogas Dam (27°41'S, 64°18'W), Santiago del Estero Province. MD: Not indicated. DS: Larvae. Reference: Zeiss & Seigneur (1981). SI: Intestinal caecum and peritoneum of intestine.

Lo: Río Hondo Reservoir (27°31'S, 64°53'W) Tucumán-Santiago del Estero Provinces. MD: CH-N-FML # 01830 and IPUAT # 0247. DS: Larvae. Reference: Ramallo & Torres (1995). Remarks: Zeiss & Seigneur (1981) also identified adults of *Contracaecum rudolphii* in the ventricle of *Phalacrocorax brasiliensis*, but they did not provide morphometric characterizations of the larval stages and adult forms of this parasite. Moreover, the type specimens were not deposited in a collection. Thus, we consider that this record is doubtful and has to be carefully reviewed.

**Genus *Goezia* Zeder, 1800**

Synonyms: *Cochlus* Zeder, 1803; *Prionoderma* Rudolphi, 1808; *Lecanocephalus* Diesing, 1839.

***Goezia* sp.**

Host *Odontesthes bonariensis* ◦

SI: Corporal cavity. Lo: Casa de Piedra Reservoir (38°10'S, 67°30'W), Río Negro-La Pampa Provinces. MD: Not indicated. DS: Not indicated. Reference: Gilbert *et al.* (1993), Ortubay *et al.* (1994). Gilbert *et al.* (1993) recorded *Cucullanus* sp. in *O. mykiss* and *O. bonariensis* from Patagonia, but these records belong to *Goezia* sp. according to Ortubay *et al.* (1994).

Host *Oncorhynchus mykiss* (Walbaum) ◦

SI: Corporal cavity. Lo: Casa de Piedra Reservoir (38°10'S, 67°30'W), Río Negro-La Pampa Provinces. MD: Not indicated. DS: Not indicated. Reference: Gilbert *et al.* (1993), Ortubay *et al.* (1994). Remarks: Gilbert *et al.* (1993) recorded *Cucullanus* sp. in *O. mykiss* and *O. bonariensis* from Patagonia, but these records belong to *Goezia* sp. according to Ortubay *et al.* (1994). Despite Ortubay *et al.* (1994) did not report the stage of development of this parasite, considering site of infection it can be inferred that it is a larval form in a paratenic host (Rauque *et al.*, 2018). *Odontesthes bonariensis* and *O. mykiss* are introduced species into Patagonia, they are present in various lakes and rivers of the Andes Mountains (Cussac *et al.*, 2016). Thus, *Goezia* sp. could be considered an introduced parasite with a high specificity for *O. bonariensis* and *O. mykiss* and have not yet switched to the native fish species in Patagonia (Rauque *et al.*, 2018).

***Goezia spinulosa* (Diesing, 1839)**

Host *Pseudoplatystoma corruscans* (Spix & Agassiz)

SI: Stomach. Lo: Río Paraná Medio, Corrientes Province. MD: CECOAL. DS: Adults (males, females). Reference: Hamann (1984).

**Family Raphidascarididae**

**Genus *Hysterothylacium* Ward & Magath, 1916**

***Hysterothylacium* sp.**

Host *Odontesthes bonariensis* (Valenciennes)

SI: Mesentery. Lo: Salada Grande, General Lavalle (36°55'S, 56°58'W) and Lacombe, Lezama (35°49'S, 57°49'W) Lagoons, Buenos Aires Province. MD: CHM-LP. DS: Larvae (L3). Reference: Drago (2012). Remarks: The life cycles and larval developmental of *Hysterothylacium* species are little known. *Hysterothylacium* larvae occur in Neotropical freshwater fishes serving as paratenic host (Moravec, 1998). Thus, *Odontesthes bonariensis* may be likely paratenic host for this parasite.

Host *Odontesthes hatcheri* (Eigenmann) (syn. *Patagonina hatcheri*)

SI: Intestine. Lo: Alicurá Reservoir (40°40'S, 71°00'W), Río Negro-Neuquén Provinces. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994). Remarks: *Hysterothylacium* sp. may be a new parasite species or likely, it belongs to *Hysterothylacium patagonense*, which was later record in *Odontesthes hatcheri* by Flores *et al.* (2016).

Host *Percichthys trucha* (Valenciennes)

SI: Intestine. Lo: Alicurá Reservoir (40°40'S, 71°00'W), Río Negro-Neuquén Provinces, Escondido Lake (41°05'S, 71°35'W) and Moreno Lake (41°06'S, 71°32'W), Río Negro Province. MD: Not indicated. DS: Adult. Reference: Ortubay *et al.* (1994).

***Hysterothylacium patagonense* Moravec, Urawa & Coria, 1997**

Host *Percichthys trucha* (Valenciennes)

SI: Intestine (secondarily found in abdominal cavity). Lo: Aluminé Lake (38°55'S, 71°10'W) Negro River drainage system, Neuquen Province. MD: Type-material: IPCAS Helm. (holotype, allotype, and some paratypes, Cat. # 675); NHM (paratypes, Reg. # 1996.5.30-1-5), and Meguro Parasitological Museum, Tokyo (paratypes, Cat. # 19695). DS: Adults and third and fourth stage larvae. Reference: Moravec *et al.* (1997a).

Host *Galaxias maculatus* (Jenyns)

SI: Abdominal cavity. Lo: Quillén Lake, Neuquén; Espejo Chico Lake and Escondido lake, Río Negro Province. MD: MACN-Pa 465. DS: Larvae. Reference: Viozzi *et al.* (2009).

Host *Odontesthes hatcheri* (Eigenmann)

SI: Intestine. Lo: Morenito lake (41°02'S, 68°34'W); Moreno Oeste lake (41°06'S, 71°32'W), Río Negro Province. MD: CHMLP. DS: Fourth stage larvae. Reference: Flores *et al.* (2016).

Host *Oncorhynchus mykiss* (Walbaum)

SI: Intestine. Lo: Lake Alumine (38°55'S, 71°10'W) and Lake Huechulafquen, Negro River drainage system, Neuquen Province. MD: Not indicated. DS: Third- and fourth-stage larvae. Reference: Moravec *et al.* (1997a).

Host *Salvelinus fontinalis* (Mitchill)

SI: Intestine. Lo: Lake Alumine (38°55'S, 71°10'W), Negro River drainage system, Neuquen Province. MD: Not indicated. DS: Third- and fourth-stage larvae. Reference: Moravec *et al.* (1997a).

Host *Salmo trutta* Linnaeus

SI: Intestine. Lo: Lake Huechulafquen, Negro River drainage system, Neuquen Province. MD: Not indicated. DS: Third- and fourth-stage larvae. Reference: Moravec *et al.* (1997a). Remarks: According to Moravec *et al.* (1997a) these third- and fourth-stage larvae, like those found in *O. mykiss* and *S. fontinalis*, are morphologically and biometrically identical with those of *H. patagonense* from the type-host, *Percichthys trucha*. Moreover, since *H. patagonense* seems to be the only *Hysterothylacium* species present in Alumine and Huechulafquen lakes, the larvae were considered to belong to *H. patagonense*. These three salmonid species are introduced into Argentina, so apparently they can acquire infection by feeding on intermediate or paratenic hosts, but the nematode larvae cannot mature in them. Thus, salmonids may be considered paratenic hosts of this nematode species.

***Hysterothylacium rhamdiae* Brizzola & Tanzola, 1995**

Host *Rhamdia sapo* (Valenciennes)

SI: Intestine. Lo: Napostá stream (38°08'S, 61°47'W); and Sauce Grande River (38°43'S, 62°15'W), Buenos Aires Province. MD: Holotype and allotype MACN # 373, and paratypes Laboratorio de Parasitología, Depto. Biología y Bioquímica, Universidad Nacional del Sur # 001-004. DS: Adults (males, females). Reference: Brizzola & Tanzola (1995).

**Genus *Raphidascaris* Railliet & Henry, 1915**

Synonyms: *Ichthyascaris* Wu, 1949; *Neogoezia* Kreis, 1937; *Sprentascaris* Petter & Cassone, 1984.

**Subgenus *Sprentascaris* Petter & Cassone, 1984  
*Raphidascaris* (*Sprentascaris*) *marano* Ramallo, 2009**

Host *Hypostomus cordovae* (Günther)

SI: Intestine. Lo: Marapa River (27°37'S, 65°41'W), Tucumán Province. MD: Holotype CH-N-FML # 07462-A; allotype CH-N-FML # 07462-B, and paratypes CH-N-FML # 07463. DS: Adults. Reference: Ramallo (2009).

***Raphidascaris (Sprentascaris) saltaensis* Ailán Choke, Ramallo & Davies, 2017**

Host *Rineloricaria steinbachii* (Regan) (syn. *Loricaria steinbachii*)

SI: Intestine. Lo: La Caldera River (24°35'S, 65°22'W), Salta Province. MD: Holotype: female CH-N-FML #07663; Allotype: not assigned; Paratypes CH-N-FML # 07665. DS: Adults. Reference: Ailán-Choke *et al.* (2017).

**Superfamily Seuratoidea**

**Family Cucullanidae**

**Genus *Cucullanus* Müller, 1777**

**Subgenus *Cucullanus* Müller, 1777**

***Cucullanus (Cucullanus) pauliceae* Vaz & Pereira, 1934**

Host *Zungaro zungaro* (Humboldt) [syn. *Paulicea luetkeni* (Steindachner)] •

SI: Small and large intestine. Lo: Paraná Medio River, Corrientes Province. MD: CECOAL. DS: Adults. Reference: Hamann (1984). Remarks: Host originally reported as *Paulicea lutkeni* (synonym of *Z. zungaro*). According to Mirande & Koerber (2020), *Z. zungaro* is not distributed in Argentina. Probably, due to similarity among them, the original record of *P. lutkeni* by Hamann (1984) corresponds to *Zungaro jahu*, which inhabit in the Parana River basin.

***Cucullanus (Cucullanus) pinnai pinnai* Travassos, Artigas & Pereira, 1928**

Host *Heptapterus mustelinus* (Valenciennes)

SI: Stomach. Lo: El Tunal Dam (25°15'S, 64°25'W), Salta Province. MD: Not indicated. DS: Adults. Reference: Cancino & Ramallo (2008).

Host *Jenynsia alternimaculata* (Fowler)

SI: Intestine. Lo: Strem affluent of Yacones River (24°31'S, 65°24'W), Isasmendi Stream (24°48'S, 64°26'W), Salta Province. MD: CH-N-FML # 7512, UNSa-IEBI-I # 050. DS: Adults. Reference: Ailán-Choke *et al.* (2014).

Host *Luciopimelodus pati* (Valenciennes)

SI: Intestine. Lo: Río Paraná Medio, Corrientes Province. MD: Not indicated. DS: Adults and third- and fourth-stage larvae. Reference: Hamann (1985).

Host *Pimelodus maculatus* Lacepède [syn. *Pimelodus clarias* (Linnaeus)].

SI: Intestine. Lo: Río Paraná Medio, Corrientes Province. MD: Not indicated. DS: Adults and third- and fourth-stage larvae. Reference: Hamann (1985). SI: Intestine. Lo: San Javier River (31°13'S, 60°10'W), Cayastá; Feller Lagoon (31°01'S, 60°01'W); San Javier River,

Helvecia, Santa Fé Province. MD: MFA-ZI-N-233. DS: Adults. Reference: Chemes & Takemoto (2020).

Host *Pimelodus albicans* (Valenciennes)

SI: Intestine. Lo: Paraná Medio River, Corrientes Province. MD: Not indicated. DS: Adults. Reference: Hamann (1985). SI: Intestine. Lo: Río Hondo Reservoir (27°31'S, 64°53'W), Santiago del Estero-Tucuman Provinces. MD: CH-N-FML # 01840. DS: Adults. Reference: Ramallo (1999). SI: Stomach. Lo: Pilcomayo River (22°22'S, 62°32'W), Salta Province. MD: CH-N-FML # 7775. DS: Adults. Reference: Ramallo *et al.* (2020).

Host *Pseudoplatystoma corruscans* (Spix & Agassiz)

SI: Intestine. Lo: Río Paraná Medio, Corrientes Province. MD: Not indicated. DS: Adults and third- and fourth-stage larvae. Reference: Hamann (1985).

Host *Trichomycterus spegazzinii* (Berg) \*\*

SI: Intestine. Lo: Strem affluent of Yacones River (24°31'S, 65°24'W), Isasmendi Stream (24°48'S, 64°26'W), Salta Province. MD: UNSa-IEBI-I # 050. DS: Adults. Reference: Ailán-Choke *et al.* (2014). SI: Intestine. Lo: La Caldera River (24°35'S, 65°22'W), Yacones River (24°40'S, 65°24'W) Salta Province. MD: UNSa-IEBI-I # 060. DS: Adults. Reference: Present study. Remarks: New locality record.

**Genus *Dichelyne* Jägerskiöld, 1902**

**Subgenus *Cucullanellus* (Tornquist, 1931)**

***Dichelyne (Cucullanellus) mariajuliae* Alarcos *et al.*, 2006**

Host *Pogonias cromis* (Linnaeus)

SI: Middle and posterior intestine. Lo: Mar Chiquita coastal lagoon (37°32'S, 57°19'W), Buenos Aires Province. MD: (H) CHMLP# 5520; (A) CHMLP# 5521; (P) CHMLP # 5522. DS: Adults (males and females). Reference: Alarcos *et al.* (2006).

**Genus *Neocucullanus* Travassos, Artigas & Pereira, 1928**

***Neocucullanus marcelae* Ramallo, 2012**

Host *Salminus brasiliensis* (Cuvier, 1816)

SI: Intestine, pyloric caeca and liver. Lo: El Chorro, Juramento River (25°13'S, 64°28'W), Salta Province. MD: (H): CH-N-FML# 07488; (A): CH-N-FML #07489; (P) CH-N-FML# 07490. DS: Adults. Reference: Ramallo (2012).

**Order Spirurida**  
**Superfamily Camallanoidea**  
**Family Camallanidae**  
**Genus *Camallanus* Railliet & Henry, 1915**

Synonym: *Zeylanema* Yeh, 1960

**Subgenus *Zeylanema* Yeh, 1960**

***Camallanus (Zeylanema) corderoi* Torres, Teuber & Miranda, 1990**

Host *Galaxias maculatus* (Jenyns)

SI: Intestine. Lo: Nahuel Huapi Lake (41°03'S, 71°25'W), Neuquén and Río Negro Provinces. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994). SI: Intestine. Lo: Moreno Lake (41°04'S, 71°33'W), Neuquen Province. MD: Not indicated. DS: Not indicated. Reference: Rauque *et al.* (2003). SI: Intestine. Lo: Senillosa Channel (Limay River) (38°50'S, 68°30'W); Lakes: Ñorquinco (39°09'S, 71°17'W), Huechulafquén (39°45'S, 71°25'W), Morenito (41°05'S, 71°31'W), and Escondido (41°05'S, 71°35'W); and Calefu River (40°30'S, 71°17'W), Patagonia. MD: MACN-Pa 463. DS: Larvae. Reference: Viozzi *et al.* (2009). SI: Intestine. Lo Nahuel Huapi Lake (41°04'S, 71°25'W), Neuquén and Río Negro Provinces. MD: Not indicated. DS: Larvae. Reference: Fernandez *et al.* (2015). Remarks: The records of *Camallanus (Zeylanema) corderoi* larvae has to be carefully reviewed, because their morphology does not enable to identify them to species. *Camallanus (Zeylanema) corderoi* is a common parasite of *Percichthys trucha*. According to Rauque *et al.* (2018), *C. corderoi* uses the native *G. maculatus* as intermediate host and the native *P. trucha* as definitive.

Host *Galaxias platei* Steindachner

SI: Intestine. Lo: Ezquerra Lagoon (41°03'S, 71°33'W), Río Negro Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994). SI: Intestine. Lo: Moreno Lake (41°04'S, 71°33'W), Neuquen Province. MD: Not indicated. DS: Not indicated. Reference: Rauque *et al.* (2003).

Host *Jenynsia multidentata* (Jenyns) ■

SI: Intestine. Lo: Arroyón Stream (38°43.66'S 68°02.4'W), Neuquén River, Neuquén Province. MD: MACN-Pa 657/1. DS: non-gravid adults. Reference: Rauque *et al.* (2018).

Host *Odontesthes bonariensis* (Valencienne)

SI: Intestine. Lo: Pellegrini Lake (38°41'S, 68°00'W), Neuquén River, Neuquén Province. MD: MACN-Pa 657/1. DS: gravid adults. Reference: Rauque *et al.* (2018).

Host *Odontesthes hatcheri* (Eigenmann) (syn. *Patagonina hatcheri*).

SI: intestine. Lo: Alicurá Reservoir, Río Negro-Neuquén Provinces, Pellegrini Lake, Río Negro Province. MD:

Not indicated. DS: Adults. Reference: Ortubay *et al.*, 1994. SI: Intestine. Lo: Marimenuco Reservoir (38°32'S, 69°25'W), Neuquén province; Lezana Lake (42°27'S, 71°29'W) and Musters Lake (45°25'S, 69°11'W), Chubut Province; Morenito lake (41°02'S, 68°34'W) and Moreno Oeste Lake (41°06'S, 71°32'W), Río Negro Province. MD: CHMLP. DS: Adults. Reference: Flores *et al.* (2016).

Host *Oncorhynchus mykiss* (Walbaum)

SI: intestine. Lo: Alicurá Reservoir (40°40'S, 71°00'W), Río Negro-Neuquén Provinces. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994). SI: Intestine. Lo: Moreno Lake (41°04'S, 71°33'W), Neuquen Province. MD: Not indicated. DS: Not indicated. Reference: Rauque *et al.* (2003). SI: Intestine. Lo: El Chañar Reservoir (38°34.5'S, 68°24'W), Neuquén River; Escondido Lake (41°42'S, 71°38'W), Morenito Lake (41°03'S 71°31'W), Moreno Lake (41°05'S, 71°30'W), Nahuel Lake (41°05'S, 71°20'W), Ramos Mexía Reservoir (39°26'S, 68°56'W), downstream Arroyito Dam (39°04.5'S, 68°33'W), all Limay River, Río Negro Province. MD: MACN-Pa 657/1. DS: non-gravid adults. Reference: Rauque *et al.* (2018).

Host *Percichthys trucha* (Valenciennes)

SI: Stomach, intestine, pyloric caecum. Lo: Moreno (41°06'S, 71°32'W) and Pellegrini (38°40'S, 68°00'W) Lakes, Ezquerra Lagoon (41°03'S, 71°33'W); Casa de Piedra Stream (38°10'S, 67°30'W) and Alicurá Reservoir (40°40'S, 71°00'W), Río Negro-Neuquén Provinces. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994) and Rauque *et al.* (2003).

Host *Salmo salar* Linnaeus

SI: Intestine. Lo: Alicurá Reservoir (40°35'S, 70°50'W), Limay River, Río Negro Province. MD: MACN-Pa 657/1. DS: non-gravid adults. Reference: Rauque *et al.* (2018).

Host *Salmo trutta* Linnaeus

SI: Intestine. Lo: Moreno Lake (41°05'S, 71°30'W); Gutiérrez Lake (41°12'S, 71°24.5'W), Nahuel Huapi Lake (41°05'S, 71°20'W), Alicurá Reservoir (40°35'S, 70°50'W), Piedra del Águila Reservoir (40°19'S, 70°03'W), Pichi Picún Leufú Reservoir (40°01'S, 70°00'W), all Limay River, Río Negro Province. MD: MACN-Pa 657/1. DS: non-gravid adults. Reference: Rauque *et al.* (2018).

Host *Salvelinus fontinalis* (Mitchill)

SI: Intestine. Lo: General Vintter Lake (43°52'S, 71°30'W) and Corcovado River (40°40'S, 71°00'W), Chubut Province. MD: Not indicated. DS: Not indicated. Reference: Úbeda *et al.* (1989). SI: Intestine. Lo: Moreno Lake (41°04'S, 71°33'W), Neuquen Province. MD: Not indicated. DS: Not indicated. Reference: Rauque

*et al.* (2003). SI: Intestine. Lo: Moreno Lake (41°05'S, 71°30'W), Limay River, Río Negro Province. MD: MACN–Pa 657/1. DS: non-gravid adults. Reference: Rauque *et al.* (2018).

### Subgenus *Camallanus* Railliet & Henry, 1915

#### *Camallanus* (*Camallanus*) *tridentatus* (Drasche, 1884)

Synonym: *Cucullanus tridentatus* Drasche, 1884

Host *Oncorhynchus mykiss* (Walbaum) °

SI: Intestine. Lo: Lezama Lake, Chubut Province. MD: Not indicated. DS: Adults. Reference: Úbeda *et al.* (1989).

Host *Percichthys colhuapiensis* MacDonagh

SI: Not indicated. Lo: Ezequiel Ramos Mexia Reservoir (39°30'S, 69°00'W), Río Negro-Neuquén Provinces. MD: Not indicated. DS: Not indicated. Reference: Ortubay *et al.* (1994).

Host *Percichthys trucha* (Valenciennes) °

SI: Pyloric caecum, small intestine and stomach. Lo: Pellegrini Lake (38°40'S, 68°00'W), Río Negro Province. MD: Not indicated. DS: Adults. Reference: Szidat (1956). SI: Intestine and stomach. Lo: Mosquito Lagoon and Lezama Lake, Chubut Province. MD: Not indicated. DS: Adults. Reference: Úbeda *et al.* (1989).

Host *Salvelinus fontinalis* (Mitchill) °

SI: Intestine. Lo: Winter Lake and Corcovado River, Chubut Province. MD: Not indicated. DS: Adults. Reference: Úbeda *et al.* (1989). Remarks: According to Ortubay *et al.* (1994), *C. tridentatus* reported on *O. mykiss*, *P. trucha*, and *S. fontinalis* (Úbeda *et al.*, 1989), was misidentified and could correspond to *Camallanus corderoi*.

### Genus *Procamallanus* Baylis, 1923

#### Subgenus *Denticamallanus* Moravec & Thatcher, 1997

#### *Procamallanus* (*Denticamallanus*) *ana* Ramallo, 2011

Host *Thoracocharax stellatus* (Kner)

SI: Intestine. Lo: Teuquito River (24°12'S, 62°54'W), Salta Province. MD: (H) CH-N-FML # 07475; (A) CH-NFML # 07476, and (P) CH-N-FML # 07477. DS: Adults. Reference: Ramallo (2011).

### Genus *Spirocamallanus* Olsen, 1952

#### *Spirocamallanus hilarii* Vaz & Pereira, 1934

Synonyms: *Procamallanus cearensis* Pereira, Dias & Azevedo, 1936; *Spirocamallanus incarocai* Freitas & Ibañez, 1970.

Host *Astyanax abramis* (Jenyns)

SI: Intestine and stomach. Lo: (27°33'S, 64°57'W), Tucumán and Santiago del Estero Provinces. MD: Not indicated. DS: Adults. Reference: Ramallo (2005a).

Host *Astyanax bimaculatus* (Linnaeus)

SI: Intestine and stomach. Lo: Escaba Dam (27°42'S, 64°48'W), Río Hondo Reservoir (27°33'S, 64°57'W), Tucumán and Santiago del Estero Provinces. MD: CH-N-FML # 04018 for record from Escaba Dam. DS: Adults. Reference: Ramallo (2005a). SI: Intestine and stomach. Lo: El Tunal Reservoir (25°14'S, 64°31'W), Salta Province. MD: Not indicated. DS: Adults. Reference: Cancino & Ramallo (2008). SI: Intestine and stomach. Lo: Itaú River (22°20'S, 64°05'W). MD: CH-N-FML #07480. DS: Adults. Reference: Antelo *et al.* (2016). Remarks: Host originally reported as *Astyanax bimaculatus*, but according to Lucena & Soares (2016) the material identified as *A. bimaculatus* corresponds to *A. lacustris*.

Host *Bryconamericus thomasi* Fowler (syn. *Piabina thomasi*) \*\*

SI: Intestine. Lo: Itaú River (22°20'S, 64°05'W), Salta Province. MD: Not indicated. DS: Adults. Reference: Antelo *et al.* (2016). SI: Intestine. Lo: Arias River (24°47'S, 65°28'W), Arias-Arenales River (24°48'S, 65°25'W), San Lorenzo River (24°47'S, 65°28'W), Salta Province. MD: UNSa-IEBI-I # 0051. DS: Adults. Reference: Present study. Remarks: new locality records.

Host *Psalidodon anisitsi* (Eigenmann) (syn. *Hyphessobrycon anisitsi*)

SI: Intestine. Lo: Salado River (28°48'S, 62°39'W), Añatuya, General Taboada Department, Santiago del Estero Province. MD: CH-N-FML # 7732. DS: Adults. Reference: Ramallo & Ailán-Choke (2017).

Host *Hoplias misionera* Rosso *et al.*

SI: Intestine and stomach. Lo: Río Hondo Reservoir (27°31'S, 64°53'W), Tucumán-Santiago del Estero Provinces. MD: Not indicated. DS: Adults. Reference: Ramallo (1997).

Host *Jenynsia alternimaculata* (Fowler)

SI: Intestine. Lo: Isasmendi Stream (24°48'S, 65°26'W); Yacones River (24°40'S, 65°24'W), Salta Province. MD: CH-N-FML # 7513; UNSa-IEBI-I # 0051. DS: Adults. Reference: Ailán-Choke *et al.* (2014).

Host *Megaleporinus obstusidens* Valenciennes (syn. *Leporinus obtusidens*)

SI: Intestine and stomach. Lo: Río Hondo Reservoir (27°31'S, 64°53'W), Tucumán-Santiago del Estero Provinces. MD: Not indicated. DS: Adults. Reference: Ramallo (1997).

Host *Oligosarcus jenynsii* (Günther)

SI: Intestine and stomach. Lo: Río Hondo Reservoir (27°31'S, 64°53'W), Tucumán-Santiago del Estero Provinces. MD: Not indicated. DS: Adults. Reference: Ramallo (1997).

Host *Pimelodus albicans* (Valenciennes)

SI: Intestine and stomach. Lo: Río Hondo Reservoir (27°31'S, 64°53'W), Tucumán-Santiago del Estero Provinces. MD: CH-N-FML # 01937. DS: Adults. Reference: Ramallo (1997).

Host *Psalidodon eigenmanniorum* (Cope) (syn. *Astyanax eigenmanniorum*) \*\*\*

SI: Intestine. Lo: Arias River (24°47'S, 65°28'W), Arias-Arenales River (24°48'S, 65°25'W), San Lorenzo River (24°47'S, 65°28'W), Salta Province. MD: UNSa-IEBI-I # 0051. DS: Adults. Reference: Present study. Remarks: New host and locality records.

Host *Psalidodon endy* (Mirande, Aguilera & Azpelicueta) (syn. *Astyanax endy*) \*\*\*

SI: Intestine. Lo: La Caldera River (24°35'S, 65°22'W), La Calderilla Stream (24°39'S, 65°22'W), Campo Alegre Dam (24°34'S, 65°21'W) Salta Province. MD: UNSa-IEBI-I N°0051. DS: Adults. Reference: Present study. Remarks: New host and locality records.

Host *Psalidodon rutilus* (Jenyns) [syn. *Astyanax fasciatus* (non Cuvier, 1819)]

SI: Intestine and stomach. Lo: Río Hondo Reservoir (27°33'S, 64°57'W), Tucumán and Santiago del Estero Provinces. MD: CH-N-FML # 07426. DS: Adults. Reference: Ramallo (2005a).

Host *Salminus brasiliensis* (Cuvier) \*\*

SI: Intestine and stomach. Lo: Río Hondo Reservoir (27°31'S, 64°53'W), Tucumán-Santiago del Estero Provinces. MD: CH-N-FML #01301. DS: Adults. Reference: Ramallo (1997). SI: Intestine. Lo: Juramento River (25°13'S, 64°28'W), Salta Province. MD: CH-N-FML #07800 and 07801. DS: Adults. Reference: Present study. Remarks: New locality record.

Host *Trichomycterus spegazzini* (Berg) \*\*\*

SI: Intestine. Lo: La Caldera River (24°35'S, 65°22'W), Salta Province. MD: UNSa-IEBI-I # 0051. DS: Adults. Reference: Present study. Remarks: New host and locality records.

### ***Spirocamallanus huacraensis* Ramallo, 2008**

Host *Trichomycterus corduvensis* Weyenbergh

SI: Intestine. Lo: Huacra River (28°00'S, 65°33'W), Catamarca Province. MD: (H) CH-N-FML #07432, (A) CH-N-FML # 07431, (P) CH-N-FML #07433. DS:

Adults. References: Ramallo (2008). SI: Intestine. Lo: Vis-Vis River (27°15'S, 66°35'W), Catamarca Province. MD: CH-N-FML # 07478. DS: Adults. Reference: Ramallo & Padilla Bortayro (2011).

Host *Trichomycterus spegazzini* (Berg)

SI: Intestine. Lo: Escoipe River (25°06'S, 65°36'0.4" W) Salta. MD: MACN-Pa N°662. DS: Adults. Reference: Ailán-Choke *et al.* (2019).

### ***Spirocamallanus inopinatus* Travassos, Artigas & Pereira, 1928**

Synonyms: *Procamallanus fariasi* Pereira, 1935; *P. wrighti* Pereira, 1935; *P. probus* Pinto & Fernandes, 1972.

Host *Brycon orbignyanus* (Valenciennes)

SI: Intestine. Lo: Middle Paraná River and Santa Lucía River, Corrientes Province. MD: Not indicated. DS: Not indicated. Reference: Hamann (1986).

Host *Poptella paraguayensis* (Eigenmann) (syn. *Ephypicharax orbicularis paraguayensis*)

SI: Intestine. Lo: Middle Paraná River and Santa Lucía River, Corrientes Province. MD: Not indicated. DS: Not indicated. Reference: Hamann (1986).

Host *Hoplias misionera* Rosso *et al.*

SI: Intestine. Lo: Pilcomayo River (22°22'S, 62°32'W) Rivadavia Department, Salta Province. MD: CH-N-FML # 7776. DS: Adults. Reference: Ramallo *et al.* (2020).

Host *Megaleporinus obtusidens* (Valenciennes)

SI: Intestine. Lo: Middle Paraná River and Santa Lucía River, Corrientes Province. MD: Not indicated. DS: Not indicated. Reference: Hamann (1986).

Host *Leporinus maculatus* Müller & Troschel ●

SI: Intestine. Lo: Middle Paraná River and Santa Lucía River, Corrientes Province. MD: Not indicated. DS: Not indicated. Reference: Hamann (1986). Remarks: *Leporinus maculatus* is not occurring in Argentina (Mirande & Koerber, 2020), but according to Braga (1993) and López *et al.* (2003), the records of this species could correspond to *Leporinus acutidens*.

Host *Luciopimelodus pati* (Valenciennes)

SI: Intestine. Lo: Middle Paraná River and Santa Lucía River, Corrientes Province. MD: Not indicated. DS: Not indicated. Reference: Hamann (1986).

Host *Pimelodus maculatus* Lacépède

SI: Intestine. Lo: Coronda River (31°41'S, 60°44'W), Santo Tomé, Santa Fé Province. MD: MFA-ZI-N-232. DS: Only one male. Reference: Chemes & Takemoto (2020).

Host *Pseudoplatystoma corruscans* (Spix & Agassiz)  
SI: Intestine. Lo: Middle Paraná River and Santa Lucía River, Corrientes Province. MD: Not indicated. DS: Not indicated. Reference: Hamann (1986).

Host *Pygocentrus nattereri* Kner (syn. *Serrasalmus nattereri*).

SI: Intestine. Lo: Perez and Totorá Lagoons, Riachuelo Basin, Corrientes Province. MD: Not indicated. DS: Not indicated. Reference: Hamann (1986).

Host *Serrasalmus marginatus* Valenciennes

SI: Intestine. Lo: Perez and Totorá Lagoons, Riachuelo Basin, Corrientes Province. MD: Not indicated. DS: Not indicated. Reference: Hamann (1986).

Host *Serrasalmus spilopleura* Kner •

SI: Intestine. Lo: Perez and Totorá Lagoons, Riachuelo Basin, Corrientes Province. MD: Not indicated. DS: Not indicated. Reference: Hamann (1986). Remarks: According to Mirande & Koerber (2020), *S. spilopleura* is not present in Argentina, but this record could correspond to *Serrasalmus maculatus* Kner (Jégu & Santos, 2001; Mirande & Koerber, 2020).

SI: Intestine. Lo: Aeroclub and Ramada Lagoons, Riachuelo River basin, Corrientes Province. MD: Not indicated. DS: Adults. Reference: Hamann (1995/1996).

#### ***Spirocamallanus juana* Ramallo & Ailán Choke, 2017**

Host *Pimelodus albicans* (Valenciennes)

SI: Intestine. Lo: Salado River (28°48'S, 62°39'W) Santiago del Estero Province. MD: (H) CH-N-FML # 07729; (A) CH-N-FML # 07730; (P) CH-N-FML # 07731. DS: Adults. Reference: Ramallo & Ailán-Choke (2017).

Host *Pimelodella gracilis* (Valenciennes)

SI: Intestine. Lo: Salado River (28°48'S, 62°39'W) Santiago del Estero Province. MD: Not indicated. DS: Adults. Reference: Ramallo & Ailán-Choke (2017).

#### ***Spirocamallanus neocaballeroi* (Caballero-Deloya, 1977)**

Host *Pimelodus maculatus* Lacépède

SI: Intestine. Lo: lag Feller Lagoon (31°01'S, 60°01'W), San Javier River, Helvecia, Santa Fé Province. MD: MFA-ZI-N-231. DS: Only one male. Reference: Chemes & Takemoto (2020).

#### ***Spirocamallanus pimelodus* Pinto, Fábio, Noronha & Rolas, 1974**

Synonym: *Procamallanus intermedius* Pinto, Fábio, Noronha & Rolas, 1974.

Host *Pimelodus maculatus* Lacépède

SI: Intestine. Lo: Feller Lagoon (31°01'S, 60°01'W), San Javier River, Helvecia, Santa Fé Province. MD: MFA-ZI-N-234. DS: Adults. Reference: Chemes & Takemoto (2020).

#### ***Spirocamallanus pinto* (Kohn & Fernandes, 1988)**

Host *Trichomycterus spegazzinii* (Berg)

SI: Intestine. Lo: Isasmendi Stream (24°48'S, 65°26'W), Salta Province. MD: CH-N-FML #7515. DS: Adult. Reference: Ailán-Choke *et al.* (2014).

Host *Corydoras paleatus* (Jenyns)

SI: Intestine. Lo: Arias-Arenales River (24°48'S, 65°25'W) and Arias River (24°47'S, 65°28'W) Salta Province. MD: CH-FML # 7739. DS: Adults. Reference: Ailán-Choke *et al.* (2018).

Host *Corydoras micracanthus* Regan

SI: Intestine. Lo: Yacones River (24°40'S, 65°24'W) and Lesser River (24°39'S, 65°28'W), Salta Province. MD: CH-FML # 7740. DS: Adults. Reference: Ailán-Choke *et al.* (2018).

#### ***Spirocamallanus rarus* Travassos, Artigas & Pereira, 1928**

Synonym: *Spirocamallanus rarus* Olsen, 1952

Host *Pimelodus albicans* (Valenciennes)

SI: Small and large intestine. Lo: Middle Paraná River, Corrientes Province. MD: CECOAL. DS: Adults. Reference: Hamann (1984).

#### ***Spirocamallanus tomsici* Ramallo & Ailán Choke, 2020**

Host *Pimelodus albicans* (Valenciennes)

SI: Intestine. Lo: Misión La Paz, Pilcomayo River (22°22'S, 62°32'W), Rivadavia Department, Salta Province. MD: (H) CH-N-FML #07766; (A) CH-N-FML # 07767; (P) CH-N-FML # 07768. DS: Adults. Reference: Ramallo *et al.* (2020).

Host *Pygocentrus nattereri* Kner

SI: Intestine. Lo: Misión La Paz, Pilcomayo River (22°22'S, 62°32'W), Rivadavia Department, Salta Province. MD: CH-N-FML #07788. DS: Adults. Reference: Ramallo *et al.* (2020).

Host *Hoplias misionera* Rosso *et al.*

SI: Intestine. Lo: Misión La Paz, Pilcomayo River (22°22'S, 62°32'W), Rivadavia Department, Salta Province. MD: CH-N-FML # 7789. DS: Adults. Reference: Ramallo *et al.* (2020).



**Superfamily Cosmocercoidea****Family Atractidae****Genus *Klossinemella* Costa, 1961*****Klossinemella iheringi* (Travassos, Artigas & Pereira, 1928)**

Synonym: *Monhysterides iheringi* Travassos, Artigas & Pereira, 1928

Host *Pterodoras granulosus* (Valenciennes)

SI: Intestine. Lo: Paraná River, Corrientes Province. MD: CECOAL. DS: Adults. Reference: Hamann (1982b).

**Genus *Rondonia* Travassos, 1920*****Rondonia rondoni* Travassos, 1920**

Host *Piaractus mesopotamicus* (Holmberg) [syn. *Colossoma mitrei* (Berg)].

SI: Intestine. Lo: Paraná Medio River, Corrientes Province. MD: CECOAL. DS: Adults. Reference: Hamann (1982a).

Host *Pterodoras granulosus* (Valenciennes)

SI: Intestine. Lo: Parana Medio River, Corrientes Province. MD: CECOAL. DS: Adults. Reference: Hamann (1982b).

**Family Kathlaniidae****Genus *Spectatus* Travassos, 1923*****Spectatus spectatus* Travassos, 1923**

Host *Piaractus mesopotamicus* (Holmberg) (syn. *Colossoma mitrei*).

SI: Intestine. Lo: Paraná Medio River, Corrientes Province. MD: CECOAL. DS: Adults. Reference: Hamann (1982a).

Host *Pterodoras granulosus* (Valenciennes)

SI: Intestine. Lo: Paraná Medio River, Corrientes Province. MD: CECOAL. DS: Adults. Reference: Hamann (1982b).

**Superfamily Dracunculoidea****Family Guyanemidae****Genus *Pseudodelphis* Adamson & Roth, 1990*****Pseudodelphis limnicola* Brugni & Viozzi, 2006**

Host *Percichthys trucha* (Valenciennes)

SI: Sinus venosus and atrium, intestine, and abdominal cavity. Lo: Lake Escondido (41°05'S, 71°35'W), Nahuel Huapi National Park, Río Negro Province. MD: MACNPa (H) # 429/1; (A) # 429/2, (P) # 429/3–6 and 429/7–10; CHMLP (P) # 5519; UNCo-Pa (P) # 201/1–10 and (P) 201/11–20 and IPCAS Helm. (P) # N833 (1 male and 1 female). DS: Adult males and gravid females, larvae and sub-adults. Reference: Brugni & Viozzi (2006).

**Family Philometridae****Genus *Philonema* Kuitunen-Ekbaum, 1933**

Synonym: *Coregonema* Bauer, 1946

***Philonema percichthydis* Moravec, Urawa & Coria, 1997**

Host *Percichthys trucha* (Valenciennes)

SI: Abdominal cavity. Lo: Lago Aluminé, (38°55'S, 71°10'W), Río Negro basin, Río Negro Province. MD: IPCAS Helm. (holotype and remnants of paratypes, Cat. # N-690. DS: Two gravid females. Reference: Moravec *et al.* (1997b).

**Superfamily Habronematoidea****Family Cystidicolidae****Genus *Ascarophis* van Beneden, 1871**

Synonyms: *Capillospirura* Skrjabin, 1924; *Pseudocystidicola* Layman, 1933

***Ascarophis patagonica* Brugni & Viozzi, 2008**

Host *Galaxias platei* Steindachner

SI: Stomach. Lo: Moreno Lake (41°05'S, 71°32'W), Coyte Pond (45°25'S, 71°22'W), Río Negro Province. MD: MACN (H) # 442/1, (A) # 442/2, (P) #442/3-7 and # 442/8-12; CPUNCo (P) #5756; CHMLP (P) # 215/1-7 and # 215/8-14 and USNPC (P) #100568. DS: Males and gravid females. Reference: Brugni & Viozzi (2008).

**Genus *Placonema* Brugni, Viozzi, Fernández & Vega, 2009*****Placonema pataguense* Brugni, Viozzi, Fernández & Vega, 2009**

Host *Galaxias maculatus* (Jenyns)

SI: Stomach. Lo: Patagua Lake (40°47'S, 71°37'W), Arrayanes National Park, Río Negro Province. MD: MACN-Pa: (H) male # 446/1, (A) female # 446/2, and (P) # 446/3–5 and # 446/6–8. USNPC (P) #101088, # 101090, #101087, # 101089). UNC (P) # 216/1–5 and # 216/6–12. MLP (P) # 5865. DS: Adults. Reference: Brugni *et al.* (2009).

**Genus *Spinitectus* Fourment, 1883*****Spinitectus asperus* Travassos, Artigas & Pereira, 1928**

Synonym: *Spinitectus jamundensis* Thatcher & Padilha, 1977

Host *Prochilodus lineatus* (Valenciennes) (syn. *P. platensis* Holmberg)

SI: Stomach. Lo: Middle Paraná River, Corrientes Province. MD: CECOAL. DS: male and gravid females. Reference: Hamann (1982c). SI: Cardial stomach. Lo:

Río Hondo Reservoir (27°31'S, 64°53'W), Tucumán-Santiago del Estero Provinces. MD: CH-N-FML # 01298. DS: males, gravid females and larvae. Reference: Ramallo (1999). SI: Cardial stomach. Lo: Misión La Paz, Pilcomayo River (22°22'S, 62°32'W), Rivadavia Department, Salta Province. MD: CH-N-FML #07773. DS: Adults. Reference: Ramallo *et al.* (2020).

Host *Pimelodus albicans* (Valenciennes)

SI: Posterior intestine. Lo: Río Hondo Reservoir (27°31'S, 64°53'W), Tucumán-Santiago del Estero Provinces. MD: Not indicated. DS: Adults. Reference: Ramallo (1999).

Host *Megaleporinus obtusidens* Valenciennes

SI: Posterior intestine. Lo: Río Hondo Reservoir (27°31'S, 64°53'W), Tucumán-Santiago del Estero Provinces. MD: Not indicated. DS: Adults. Reference: Ramallo (1999).

### Family Hedruridae

#### Genus *Hedruris* Nitzsch, 1821

##### *Hedruris* sp.

Host *Galaxias maculatus* (Jenyns)

SI: Abdominal cavity. Lo: Moreno Lake (41°03'S, 71°31'W), Río Negro Province. MD: Not indicated. DS: Larvae. Reference: Revenga *et al.* (2005). SI: Stomach. Lo: Lakes Ñorquinco (39°09'S, 71°17'W), Quillén (39°25'S, 71°20'W), Tromen (39°32'S, 71°28'W); Machónico (40°20'S, 71°33'W), Hermoso (40°21'S, 71°28'W), Pudú Pudú (40°23'S, 71°28'W), Villarino (40°28'S, 71°35'W), Falkner (40°29'S, 71°29'W), Filo Hua Hum (40°30'S, 71°17'W), Espejo Chico (40°35'S, 71°44'W), Traful (40°37'S, 71°25'W), Espejo (40°41'S, 71°40'W), Correntoso (40°44'S, 71°39'W), Patagua (40°47'S, 71°37'W), Morenito (41°05'S, 71°31'W); Mascardi (41°17'S, 71°38'W), Fonck (41°18'S, 71°43'W), Hess (41°22'S, 71°43'W), Steffen (41°31'S, 71°33'W), Patagonia. MD: MACN-Pa 466. DS: Adults. Reference: Viozzi *et al.* (2009).

Host *Galaxias platei* Steindachner

SI: Not indicated. Lo: Lagoons: Zeta (42°53'S, 71°20'W), Caradogh Jones (42°54'S, 71°23'W), Huillimanco (42°52'S, 71°17'W); Rosario Lake (43°15'S, 71°20'W), Chubut Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994). SI: Stomach. Lo: Lakes: Cholila (42°27'S, 71°40'W), and Esperanza (42°13'S, 71°50'W), Chubut Province, and Pueyrredón Lake (47°16'S, 72°00'W), Santa Cruz Province; Lagoons: Huillimanco (42°52'S, 71°50'W), and La Pava, Chubut Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994).

Host *Oncorhynchus mykiss* (Walbaum)

SI: Stomach, intestine, pyloric caecum. Lo: Casa de Piedra (38°10'S, 67°30'W) Stream, Ñireco River (41°14'S, 71°11'W), Limay River and Nahuel Huapi Lake (41°03'S, 71°25'W), Río Negro Province. MD: Not indicated. DS: Adults and larvae. Reference: Ortubay *et al.* (1994). SI: Not indicated. Lo: Ñireco River (41°14'S, 71°11'W), Río Negro Province; Traful Lake (40°37'S, 71°25'W), Neuquén Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994).

Host *Percichthys trucha* (Valenciennes)

SI: Stomach. Lo: Ñireco River, Río Negro Province. MD: Not indicated. DS: Adults and larvae. Reference: Ortubay *et al.* (1994). SI: Stomach. Lo: Moreno Lake (42°27'S, 71°40'W), Río Negro Province; Cholila Lake (42°27'S, 71°40'W), Chubut Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994).

Host *Salmo trutta* Linnaeus

SI: Stomach. Lo: Hess Lake (41°22'S, 71°43'W), Río Negro Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994). SI: Stomach. Lo: Limay River (41°22'S, 71°43'W), Río Negro-Neuquén Provinces. MD: Not indicated. DS: Adults and larvae. Reference: Ortubay *et al.* (1994). Remarks: Rauque *et al.* (2018) mentioned that records of *Hedruris* sp. in *O. mykiss*, *S. trutta*, *G. maculatus*, *G. platei* and *P. trucha*, could correspond to *Hedruris suttonae*.

#### *Hedruris bifida* Rossin & Timi, 2016

Host *Oligosarcus jenynsii* (Günther)

SI: Females attached to stomach wall and males generally found encircling female. Lo: Lake Nahuel Rucá (37°37'S, 57°26'W), Buenos Aires Province. MD: (H) (MLP-He coll. # 7159), (A) (MLP-He coll. # 7160) and (P) MLP-He coll. # 7161. DS: Adults (males and females). Reference: Rossin & Timi (2016).

#### *Hedruris suttonae* Brugni & Viozzi, 2010

Host *Galaxias maculatus* (Jenyns)

SI: Stomach. Lo: Lakes: Moreno (41°03'S, 71°31'W), Ñorquinco (39°09'S, 71°17'W), Quillén (39°25'S, 71°25'W), Tromen (39°32'S, 71°27'W), Machónico (40°21'S, 71°26'W), Pudú Pudú (40°23'S, 71°28'W), Hermoso (40°23'S, 71°29'W), Villarino (40°28'S, 71°35'W), Falkner (40°29'S, 71°29'W), Filo Hua Hum (40°30'S, 71°17'W), Traful (40°37'S, 71°25'W), Espejo (40°41'S, 71°40'W), Espejo Chico (40°41'S, 71°42'W), Correntoso (40°44'S, 71°39'W), Nahuel Huapi (40°48'S, 71°39'W), Patagua (40°51'S, 71°50'W), Moreno (41°03'S, 71°31'W), Mascardi (41°17'S, 71°38'W), Fonck (41°19'S, 71°45'W), Hess (41°23'S, 71°43'W), Steffen (41°31'S, 71°33'W), Patagonia. MD: MACN-Pa

(H) and (A) # 406-1 and (P) # 406-2; UNCo-Pa (P) #129; CHLMP (P) # 4927 (5 males and 8 females), and USNPC (P) # 102470. DS: Females attached to mucosa by caudal hook, males free or coiled around females (sometimes more than 1 for each female). Reference: Brugni & Viozzi (2010).

Host *Galaxias platei* Steindachner

SI: Stomach. Lo: Lakes: Moreno (41°03'S, 71°31'W), Cisne (42°36'S, 71°56'W) and Coyte (45°15'S, 71°12'W), Patagonia. MD: Not indicated. DS: Not indicated. Reference: Brugni & Viozzi (2010).

Host *Oncorhynchus mykiss* (Walbaum)

SI: Stomach. Lo: Moreno Lake (41°05'S, 71°30'W), Nahuel Huapi Lake (41°05'S, 71°20'W), Limay River; Musters Lake (45°33'S, 69°15'W) Senguer River, Río Negro-Chubut Provinces. MD: MACN-Pa 656/1. DS: gravid adults. Reference: Rauque *et al.* (2018).

Host *Salmo trutta* Linnaeus

SI: Stomach. Lo: Nahuel Huapi (41°05'S, 71°20'W), Limay River, Río Negro Provinces. MD: MACN-Pa 656/1. DS: gravid adults. Reference: Rauque *et al.* (2018).

Host *Salvelinus fontinalis* (Mitchill)

SI: Stomach. Lo: Moreno Lake (41°05'S, 71°30'W), Nahuel Huapi Lake (41°05'S, 71°20'W), Limay River; Cholila Lake (42°27.5'S, 71°40'W), Futaleufú River, Río Negro-Chubut Provinces. MD: MACN-Pa 656/1. DS: gravid adults. Reference: Rauque *et al.* (2018). Remarks: Adult nematodes of *H. suttonae* were originally described from *G. maculatus* and *G. platei* from Patagonia (Brugni & Viozzi, 2010; Rauque *et al.*, 2018). Brugni & Viozzi (2010) reported that the intermediate host of this parasite is the amphipod *Hyaella patagonica*. Thus, its presence in salmonids probably represent a case of spillback (Rauque *et al.*, 2018).

### Superfamily Thelazioidea

#### Family Rhabdochonidae

#### Genus *Rhabdochona* Railliet, 1916

Synonyms: *Ichthyospirura* Skrjabin, 1917; *Pseudorhabdochona* Liu & Wu, 1941; *Filochona* Saidov, 1953; *Rhabdochonoides* Janiszewska, 1955; *Afrochona* Puyllaert, 1973.

#### *Rhabdochona* sp.

Host *Galaxias platei* Steindachner

SI: Stomach. Lo: Zeta Lagoon (42°53'S, 71°20'W), Santa Cruz River, Chubut Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994).

Host *Odontesthes hatcheri* (syn. *Patagonina hatcheri*)

SI: Intestine. Lo: Rosario Lake, Chubut Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994).

Host *Oncorhynchus mykiss* (Walbaum)

SI: Gastrointestinal tract. Lo: Zeta Lagoon (42°53'S, 71°20'W), Santa Cruz River, Chubut Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994). Remarks: The records of *Rhabdochona* sp. in *G. platei*, *O. hatcheri* and *O. mykiss* could correspond to *Rhabdochona acuminata* (Molin, 1860), since this parasite has been cited in many freshwater fishes from Patagonia.

#### *Rhabdochona acuminata* (Molin, 1860)

Synonyms: *Spiroptera acuminata* Molin, 1860; *Rhabdochona elegans* Travassos, Artigas & Pereira, 1928; *R. fasciata* Kloss, 1966; *R. australis* Kloss, 1966; *R. siluriformis* Kloss, 1966.

Host *Astyanax lacustris* (Luetken)

SI: Intestine. Lo: El Tunal Dam (25°15'S, 64°25'W) Salta Province. MD: Not indicated. Reference: Cancino & Ramallo (2008).

Host *Olivaichthys mesembrinus* (Ringuelet) (syn. *Diplomystes mesembrinus*).

SI: Intestine. Lo: Río Chubut, Chubut Province (43°39'-43°53'S, 66°22'-68°24'W). MD: MACN-Pa #37. DS: adults and third and fourth stage larvae. Reference: Cremonte *et al.* (2002).

Host *Galaxias maculatus* (Jenyns)

SI: Intestine. Lo: Nahuel Huapi Lake, Río Negro Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994). SI: Intestine. Lo: Río Chubut (43°39'-43°53'S, 66°22'-68°24'W) Chubut Province. MD: Not indicated. DS: Adults and third- and fourth-stage larvae. Reference: Cremonte *et al.* (2002).

Host *Galaxias platei* Steindachner

SI: Intestine. Lo: Ezquerria lagoon (41°03'S, 71°33'W) Santa Cruz Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994).

Host *Hatcheria macraei* (Girard) (syn. *Thrichomycterus macraei*).

SI: Intestine. Lo: Castaño River, San Juan Province. MD: CH-N-FML #07798. DS: Adults. Reference: Ramallo & Cancino (2021).

Host *Lebias multidentata* (Jenyns) (syn. *Jenynsia multidentata*)

SI: Intestine. Lo: Medina River (26°83'S, 65°80'W) Tucumán Province. MD: CH-N-FML#07418, #07419. DS: Adults. Reference: Ramallo (2005b).

Host *Jenynsia alternimaculata* (Fowler) \*\*

SI: Intestine. Lo: Isasmendi Stream (24°48'S, 64°26'W), Salta Province. MD: CH-N-FML # 7511. DS: Adults. Reference: Ailán-Choke *et al.* (2014). SI: Intestine. Lo: La Caldera River (24°35'S, 65°22'W) Salta Province. MD: UNSa-IEBI-I N°0053. DS: Adults. Reference: Present study. Remarks: New locality record.

Host *Odontesthes hatcheri* (Eigenmann) (syn. *Patagonina hatcheri*)

SI: Intestine. Lo: Alicurá Reservoir, Pellegrini Lake, Neuquén Province. MD: Not indicated. DS: Adults. Reference: Ortubay *et al.* (1994).

Host *Oncorhynchus mykiss* (Walbaum)

SI: intestine. Lo: Lezama Lake and Alicurá Reservoir, Neuquén Province. MD: Not indicated. DS: Adults and third- and fourth-stage larvae. Reference: Ortubay *et al.* (1994).

Host *Percichthys trucha* (Valenciennes)

SI: Intestine. Lo: Limay River, Río Negro-Neuquén Provinces. MD: Not indicated. DS: Adults. Reference: Szidat (1956).

Host *Trichomycterus spegazzinii* (Berg) \*\*\*

SI: Intestine. Lo: La Caldera River (24°35'S, 65°22'W) and Yacones River (24°40'S, 65°24'W), Salta Province. MD: CH-N-FML 07790. DS: Adults. Reference: Present study. Remarks: New host and locality records. Records: *Rhabdochona acuminata* has been recorded in many freshwater fishes from Patagonia and Northwest Argentina (Ortubay *et al.*, 1994; Cremonte *et al.*, 2002; Ramallo, 2005b; Cancino & Ramallo, 2008; Viozzi *et al.*, 2009; Ailán-Choke *et al.*, 2014). Taking into account these records, this parasite is considered a widespread species, encompassing almost all of South America (Cremonte *et al.*, 2002).

### ***Rhabdochona fabianae* Ramallo, 2005**

Host *Bryconamericus iheringi* (Boulenger)

SI: Intestine. Lo: Medina River (26°83'S, 65°80'W), Tucumán Province. MD: (H) CH-N-FML # 07422; (A) CH-N-FML # 07423; (P) CH-N-FML # 07424. DS: Adults. Reference: Ramallo (2005b).

## **DISCUSSION**

Parasites have been recognized as key components of the biodiversity of an ecosystem, regulating the abundance or density of host populations, stabilizing food webs, and structuring host communities (Luque, 2008; Luque *et al.*, 2016). Despite these key roles, they remain an underestimated component of the total biodiversity in many regions of the planet (Luque *et al.*, 2016). Thus, studies identifying hotspots of high parasite diversity,

as well as areas of relatively low parasite diversity, are crucial for a complete understanding of the functioning of the biosphere (Luque & Poulin, 2007).

The present study constitutes the most complete list of nematode parasites of freshwater fish from Argentina, including a complete bibliographic search of research on the subject. However, our current knowledge of the diversity of the nematodes parasitizing freshwater fish in Argentina is far from complete, due to the lack of sampling in several hydrological basin, families, and species of freshwater fish. To date, most sampling have been done in Great River and Patagonian ichthyogeographic provinces, while fish in Andean Cuyan, Aymaran, and Pampean ichthyogeographic provinces (Cuyan and Pampean regions) have been scarcely studied. This study effort is probably associated to the development of this line of work in scientific research centers in these regions. To date, only a small fraction of freshwater fish families and species in Argentina have been examined (21 out of its 56 fish families and 65 out of its 570 fish species) for the presence records of nematode parasites (Mirande & Koerber, 2020). The highest number of nematode parasites reported in Siluriformes and Characiformes probably reflects sampling effort, since these fish orders have the highest number of species in Argentina (Mirande & Koerber, 2020). Moreover, many species belonging to the above-mentioned fish orders are commercialized, which makes them available for parasitologists. On the other hand, the high number of nematode species recorded on Galaxiiformes could be related with its abundance and widely distribution across Patagonia (Barriga *et al.*, 2002; Baigun & Ferriz, 2003), which makes them available for parasitological surveys in this region (Brugni & Viozzi, 2008; Viozzi & Semenas, 2009; Viozzi *et al.*, 2009; Fernandez *et al.*, 2012, 2015). However, several fish taxa are poorly studied, such as Rivulidae, Poecillidae, Anablepidae (Cyprinodontiformes), and Cichlidae (Cichliformes) that also present a high richness species with respect to other fish orders recorded in Argentina (Mirande & Koerber, 2020). In addition, some endemic fish species, such as *Silvinichthys mendozensis* Arratia *et al.*, *Trichomycterus heterodontus* Eigenmann, *T. belensis* Fernández & Vari, *Xyliphius barbatus* Alonso de Arámburu & Arámburu (Siluriformes), *Rhamphichthys hahni* (Meinken, 1937) (Gymnotiformes) (López *et al.*, 2008), have not yet been examined for nematode parasites. Therefore, we recommend prioritizing the examination of previously mentioned fish species in further studies, which will allow elucidating the real pattern of distribution and host spectra of the nematode parasites of freshwater fish from Argentina.

Camallanidae harbored the highest number of nematode species recorded in freshwater fish from Argentina, with *S. hilarii*, *S. inopinatus* and *C. corderoi* as the most common adult nematodes recorded. These species present a wide range of phylogenetically distantly related

hosts belonging to different families of Characiformes and Siluriformes (in case of *S. hilarii* and *S. inopinatus*) and Atheriniformes, Galaxiiformes, Cyprinodontiformes, Centrarchiformes and Salmoniformes (in case of *C. corderoi*) (see Table 1). This fact could explain why these species are the most common, namely they are generalist species (see Moravec *et al.*, 1993, 1997c; Ramallo, 1997, 2005a; Gallas *et al.*, 2015; Rauque *et al.*, 2018; Ailán-Choke *et al.*, 2020). On the other hand, helminth larvae exhibit a low host specificity in fish, which increases their chances of reaching the definitive host, which could explain the wide host range presented by *Contracaecum* sp. larvae (Esch *et al.*, 1988). Rauque *et al.* (2018) also reported that *Contracaecum* sp. was also the most generalistic parasite, however due to the large size of salmonids, it is not likely that piscivorous birds consume adult fishes, so these fish hosts could represent a dead end for this parasite.

This checklist may contain errors derived from the inclusion of misidentified host species, such as *Astyanax bimaculatus*, *Leporinus maculatus*, *Serrasalmus spilopleura*, and *Zungaro zungaro*, since they are not distributed in Argentina according to Mirande & Koerber (2020). These last three host records were cited by Hamann (1984, 1986, 1995/1996, 1999), but the examined fishes were not deposited in a collection. Thus, these fish records are doubtful and it is difficult to assess its taxonomic identification. In the particular case of *A. bimaculatus*, it was cited by Cancino & Ramallo (2008), but according to Lucena & Soares (2016) the material identified as *A. bimaculatus* corresponds to *A. lacustris*. Problems in the identification and taxonomy of host may affect the reliability of any parasitological studies and has implications for the assessment of host specificity, the elucidation of relationship between parasite and host phylogenies and the establishment of trophic links illustrated by life-cycle studies (Naylor *et al.*, 2012; Alves *et al.*, 2017). Therefore, it is recommendable that parasitologists deposit examined host in a reference collection and preserve a piece of host tissue in molecular-grade ethanol for sequencing and to work in synergy with fish taxonomists to be as accurate as possible in the fish identification (Alves *et al.*, 2017). Other of obstacles that contribute to the lack of taxonomic accuracy in this checklist is the controversy about the validity of some nematode species that were previously listed. For instance, larvae of *Contracaecum rudolphi*, *Camallanus tridentatus*, and *Goezia* sp. are doubtful record of parasite and have to be carefully reviewed, since the examined material of these nematodes was not deposited in reference collections (Zeiss & Seigneur, 1981; Úbeda *et al.*, 1989; Gilbert *et al.*, 1993; Ortubay *et al.*, 1994). It is important to highlight the need to clarify their taxonomic status by the examination of new material from type host and localities. Thus, our recommendation is the deposition of vouchers of the studied material in reference collections, and in the case

of molecular studies the deposition of morphological voucher of molecular samples (*i. e.* piece of the organism used for the generation of molecular data, preserved in a way that can be used for morphological identification) (Blasco-Costa *et al.*, 2016).

Among the nematode taxa reported in Argentinian freshwater fishes, five were identified only to genus level. Most of them correspond to larval stages, such as *Eustrongylides* sp., *Contracaecum* sp., and *Hysterothylacium* sp. The accurate specific identification of larval stages of nematodes is problematic, because they lack key features that are present in adults only (Moravec, 1998). In addition, there are few studies dealing with their genetic characterization (for example Sardella *et al.*, 2020). Another reliable way to determine the species is to obtain adult nematodes from experimental infections of the definitive hosts (Moravec, 1998). However, studies on life cycles of these parasites are scarce in Argentina (Brugni & Viozzi, 2009). Therefore, integrative studies combining morphological and molecular data are necessary to improve the taxonomic resolution of the unidentified nematode larvae and to elucidate the real patterns of diversity of nematodes in Argentinian freshwater fish.

When comparing the number of parasitic nematode species of Argentinian freshwater fishes with that in other countries of South America, such as Paraguay (González-Solís & Mariaux, 2011) and Brazil (Luque *et al.*, 2011; freshwater records only), it turns out that Argentina has a low number of species. We conclude that the biodiversity of freshwater fish hosts and their nematode parasites in the country is underestimated, due to: 1) a small fraction of the potential freshwater fish host in Argentina have been examined for nematode parasites, 2) the sampling bias in certain geographic regions and host species that may not reflect the real distribution patterns of these parasites, and 3) the lack of accuracy in taxonomic identification of some nematode species and its host species. To fill this knowledge gap, it is necessary to perform further investigation on this group of parasites, expanding the number of fish species examined, especially in poorly studied geographical localities.

## ACKNOWLEDGEMENTS

We sincerely thank the anonymous reviewers for providing valuable comments and suggestions that contribute to improve the manuscript. The authors are thankful to Fabiana Cancino for her help in the field trip and fish identification. The present study was funded by Fundación Miguel Lillo (FML), Tucumán, Argentina. L. A. C. was supported by a Postdoctoral fellowship from the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET, Argentina).

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