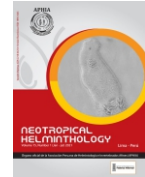


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Neotropical Helminthology



REVIEW ARTICLE / ARTICULO DE REVISIÓN

CHECKLIST OF HELMINTHS ASSOCIATED WITH CONTINENTAL TESTUDINES FROM SOUTH AMERICA

LISTA DE HELMINTOS ASOCIADOS A LOS TESTUDINES CONTINENTALES DE AMÉRICA DEL SUR

Carolina S. Mascarenhas^{1*} & Gertrud Müller¹

¹Laboratório de Parasitologia de Animais Silvestres (LAPASIL), Departamento de Microbiologia e Parasitologia, Instituto de Biologia, Universidade Federal de Pelotas (UFPel), Caixa Postal: 354, CEP 96010-900, Pelotas, RS, Brazil.

*Corresponding author: phrybio@hotmail.com

Carolina S. Mascarenhas: <https://orcid.org/0000-0002-7045-0926>

Gertrud Müller: <https://orcid.org/0000-0002-2213-6721>

ABSTRACT

This study collected records of 135 *taxa* of parasitic helminths (Nematoda, Trematoda, Cestoda, Monogenoidea and Acanthocephala) and ecto-symbionts (Temnocephalida) associated with continental Testudines from South America. Eighty-nine helminths were identified at the species level while others were identified up to genus or family levels. The greatest diversity of helminths associated with Testudines was reported in Brazil. Chelidae was the family with the largest number of helminth species. Regarding the conservation status, 17 Testudines species with helminth records are cited in the IUCN Red List of Threatened Species. Knowledge of helminth biodiversity and of relations between these organisms and Testudines can provide important data on host biology. Therefore, information generated by studies of helminths can contribute to research which aims at the conservation of organisms and their habitats.

Keywords: Acanthocephala – biodiversity – Cestoda – Chelidae – conservation – Digenea – ecto-symbiont – Emydidae – freshwater turtle – Geoemydidae – IUCN – Kinosternidae – Monogenoidea – Nematoda – parasite – Podocnemididae – Temnocephala – Testudinidae – tortoise

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RESUMEN

En este estudio se recogieron registros de 135 *taxones* de helmintos parásitos (Nematoda, Trematoda, Cestoda, Monogenoidea y Acanthocephala) y ectosimbiontes (Temnocephalida) asociados a Testudines continentales de Sudamérica. Se identificaron 89 helmintos a nivel de especie, mientras que otros se identificaron hasta el nivel de género o familia. La mayor diversidad de helmintos asociados a los Testudines se registró en Brasil. Chelidae fue la familia con el mayor número de especies de helmintos. En cuanto al estado de conservación, 17 especies de Testudines con registros de helmintos están citadas en la Lista Roja de Especies Amenazadas de la IUCN. El conocimiento de la biodiversidad de los helmintos y de las relaciones entre estos organismos y los Testudines puede aportar datos importantes sobre la biología de los hospedadores. Por lo tanto, la información generada por los estudios de los helmintos puede contribuir a la investigación que tiene como objetivo la conservación de los organismos y sus hábitats.

Palabras clave: Acanthocephala – biodiversidad – Cestoda – Chelidae – conservación – Digenea – ectosimbionte – Emydidae – Geoemydidae – IUCN – Kinosternidae – Monogenoidea – Nematoda parasito – Podocnemididae – Temnocephala – Testudinidae – tortuga de agua dulce

INTRODUCTION

Among helminths that can be associated with Testudines, there are parasites (e.g., Nematoda, Trematoda) (Vicente *et al.*, 1993; Fernandes & Kohn, 2014) and ectosymbionts (e.g., Temnocephalida) (Martínez-Aquino *et al.*, 2014). Parasitic organisms represent a significant part of biodiversity; according to Windsor (1998), they represent the largest number of species on Earth. There is at least a kind of parasite associated with every free-living species (Poulin, 1999). According to Dobson *et al.* (2008), there are between 75,000 and 300,000 species of helminths parasitizing vertebrates; this estimate suggests that there may be more parasitic species than free-living ones, reinforcing Windsor's findings (1998). Temnocephalida are composed of freshwater ectosymbionts with specificity to the host group or species (Martínez-Aquino *et al.*, 2014).

Testudines comprise 478 *taxa* (356 species and 122 subspecies) worldwide; seven species and three subspecies, i. e., 10 *taxa* (2.1%), have been extinct (Rhodin *et al.*, 2017). In South America, continental Testudines are represented by 71 *taxa*; 37 (35 threatened ones and two extinct ones) out of 71 *taxa* are cited in the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Rhodin *et al.*, 2017; IUCN,

2020). Continental Testudines undergo several negative impacts that affect their populations. The main threats are: fragmentation of terrestrial or aquatic habitats, degradation of water quality, disorderly occupation of spawning grounds, consumption of meat and eggs, illegal trade for pets and death by running over (Gibbons *et al.*, 2000; Gibbs & Shriver, 2002; Steen & Gibbs, 2004; Bujes & Verrastro, 2008). Anthropogenic actions, such as habitat change, loss of biodiversity, pollution, climate change and introduction of species, can also impact helminth fauna (Lafferty & Kuris, 2005). Dobson *et al.* (2008) estimated that from 3% to 5% of parasitic helminths will be threatened with extinction in the next 50 to 100 years.

In the literature, there is no checklist of parasitic and ectosymbiont helminths associated with continental Testudines from South America. Cohen *et al.* (2013) carried out a checklist of Monogenoidea, while Fernandes & Kohn (2014) introduced one of Trematoda from South America and Martínez-Aquino *et al.* (2014) listed the records of Temnocephalida in the Neotropical region. Therefore, this checklist, which gathered the records of parasitic and ectosymbiont helminths associated with continental Testudines from South America, aiming at contributing to the knowledge of the diversity of helminths associated with the group and at encouraging helminthological studies with group of vertebrates.

MATERIAL AND METHODS

The checklist resulted from information published in articles, books, theses and dissertations. Some specimens deposited in the Helminth Collection that belongs to the Parasitology Laboratory of Wild Animals (CHLAPASIL) at the Microbiology and Parasitology Department in the Institute of Biology at the Universidade Federal de Pelotas (UFPel), located in Pelotas, RS, Brazil, were also examined. Classification and systematization of helminths were carried out in agreement with Anderson *et al.* (2009) for Nematoda; Gibson *et al.* (2002), Jones *et al.* (2005), and Bray *et al.* (2008) for Digenea; Khalil *et al.* (1994) for Cestoda; Boeger & Kritsky (1993) for Monogenoidea; Petrochenko (1971) for Acanthocephala; and Tyler *et al.* (2006-2019) for Temnocephalida. Classification and systematization of hosts followed Rhodin *et al.* (2017).

Helminth *taxa* are shown in alphabetical order in their respective superfamilies, followed by host *taxa*, site of infection (parasitic helminths) or infestation (ectosymbionts), geographical location and respective bibliographical references (between parentheses and chronological order). Citation of helminth and host species in this list does not mean that the authors agree with their validity and taxonomy. The list of host-helminth includes the conservation status of Testudines species in agreement with the Red List of Threatened Species issued by the IUCN (2020).

RESULTS

One hundred and thirty-five helminths were recorded in association with 39 continental Testudines (34 species, three identified at the genus level and two unidentified) from nine South American countries. Eighty-nine helminths (40 Trematoda, 38 Nematoda, six Monogenoidea, three Temnocephalida and two Cestoda) were identified at the species level, while the others were identified up to genus (44 *taxa*) and family levels (2 *taxa*).

The greatest diversity of helminths associated with Testudines was reported in Brazil (94 *taxa*),

followed by Uruguay (17 *taxa*), Peru (15 *taxa*), Colombia (14 *taxa*), Argentina (13 *taxa*), Venezuela (10 *taxa*), Ecuador (10 *taxa*), French Guiana (2 *taxa*), Paraguay (1 *taxa*) and Bolivia (1 *taxa*). Figure 1 shows the number of helminths (according to the group) registered in each country. No records of helminthological studies were found in Chile, Suriname and Guyana. Chelidae was not only the family with the greatest diversity of recorded species (32), but also the group with the largest number of hosts under study (12 species) (Fig. 2). Podocnemidae and Emydidae had records of 30 and 14 species of helminths, respectively (Fig. 2). The largest numbers of *taxa* were associated with *Phrynops hilarii* (Duméril & Bibron, 1835) (21 *taxa*) and *Hydromedusa tectifera* Cope, 1870 (20 *taxa*) (Chelidae) in records from Brazil, Uruguay and Argentina.

Nematoda and Trematoda occurred in all groups of Testudines (Fig. 2); their main site of infection was the digestive tract of the hosts. Monogenoidea was mainly represented by *Polystomoides* Ward, 1917 species (Polystomatidae) parasites of the oral cavity of Chelidae species. Two Cestoda species, in Geoemydidae and in Chelidae, were recorded. Acanthocephala was only recorded in a Testudines species, *Acanthochelys spixii* (Duméril & Bibron, 1835) (Chelidae). Ectosymbiont helminths, Temnocephalidae, were recorded in six Chelidae species and in an Emydidae species. The digenetic trematode *Nematophila grandis* (Diesing, 1839) was the taxon recorded in the largest number of host species (17) belonging to Kinosternidae, Geoemydidae, Testudinidae, Chelidae and Podocnemidae. The species, which has wide geographical distribution, was found in Brazil, French Guyana, Venezuela, Ecuador, Peru, Paraguay and Argentina. Atractidae was the group of Nematoda with the largest number of representatives (27 *taxa*), which were mainly registered in Podocnemidae species in Brazil. Among Testudines reported by helminthological studies in South America, 17 were cited in the IUCN Red List of Threatened Species. However, three species, *Kinosternon integrum* Le Conte, 1854 (Kinosternidae), *Emys orbicularis* (Linnaeus, 1758) (Emydidae) and *Kinixys erosa* (Schweigger, 1812) (Testudinidae), are not native to the region. Figure 3 shows the number of helminths associated with species native to South America that were cited in the Red List. Most of these Testudines have

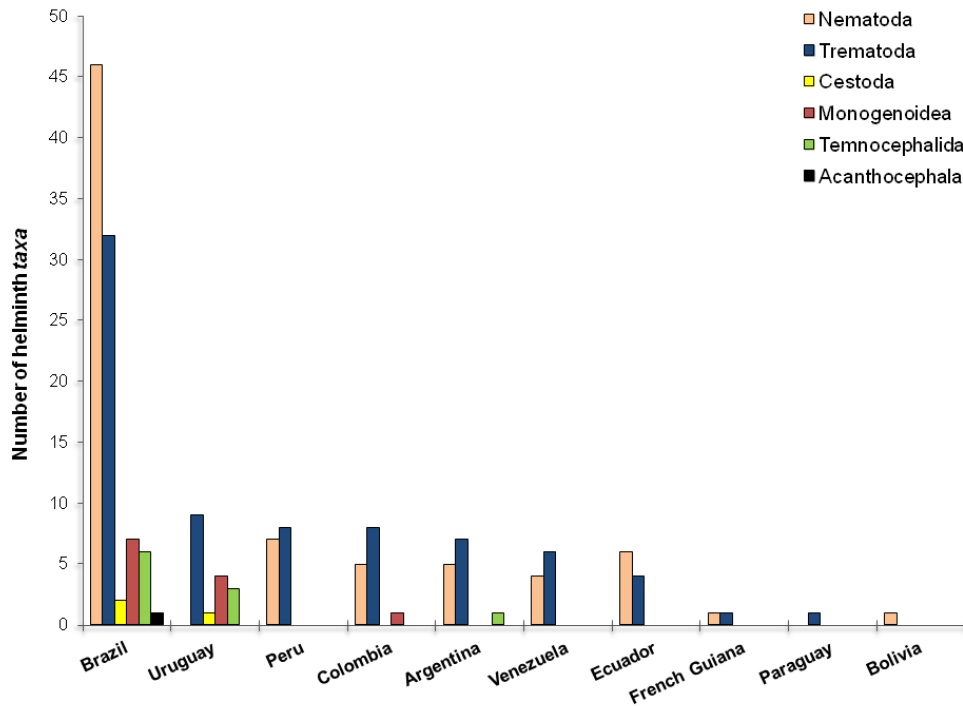


Figure 1. Number of helminths associated with continental Testudines from South America.

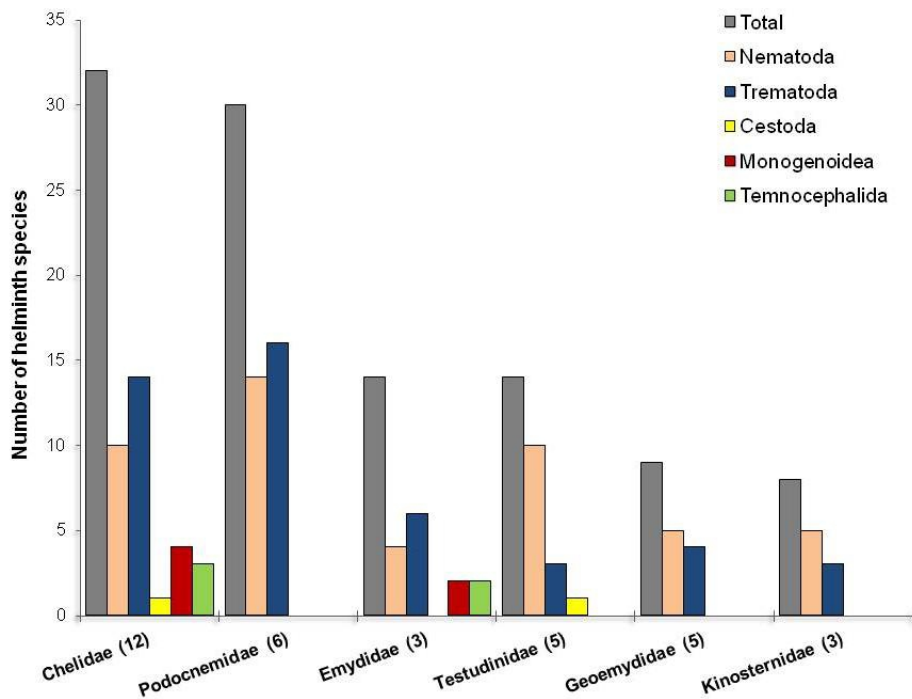


Figure 2. Number of helminth species associated with continental Testudines families from South America. Numbers of species studied in each family are between parentheses.

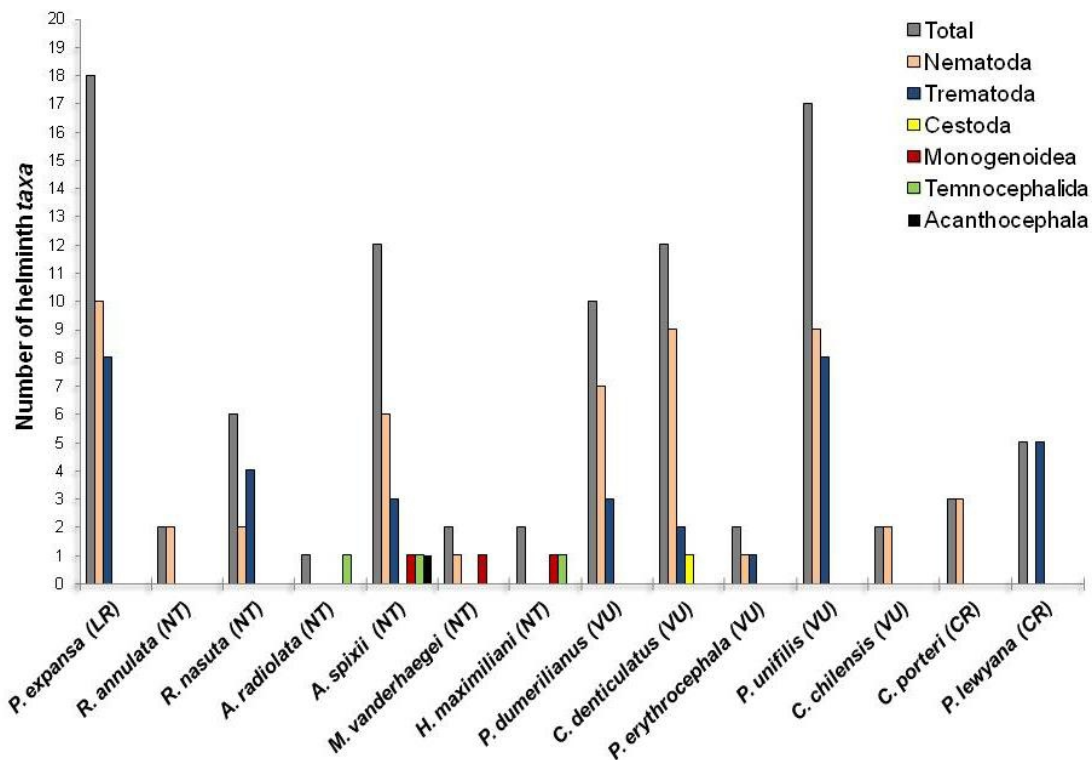


Figure 3. Number of registered helminths in association with native continental Testudines from South America cited in the IUCN Red List of Threatened Species (2020). LR – Lower Risk; NT – Near threatened; VU – Vulnerable; CR – Critically Endangered.

few records of helminths. However, Nematoda and Trematoda are the most frequently reported ones (Fig. 3).

HELMINTH-HOST LIST

Phylum Nematoda (Rudolphi, 1808)

Superfamily Dioctophymatoidea Railliet, 1916

Family Dioctophymatidae (Railliet, 1915)

Diectophyme Collet-Meygret, 1802

Diectophyme renale (Goeze, 1782) (larvae)

Acanthochelys spixii (Duméril & Bibron, 1835), large intestine, BRAZIL (Rio Grande do Sul State) (Chaviel *et al.*, 2020).

Hydromedusa tectifera Cope, 1870, body cavity (surface of stomach, and muscles) and serous of stomach BRAZIL (Rio Grande do Sul State) (present study, CHLAPASIL 882).

Phrynops hilarii (Duméril & Bibron, 1835), muscles, body cavity (surface of esophagus, stomach, lung, liver) and serous of stomach, BRAZIL (Rio Grande do Sul State) (Mascarenhas *et al.*, 2017).

Trachemys dorbigni (Duméril & Bibron, 1835), body cavity, muscles, mesentery, stomach serous lining and on surfaces of the lung, heart, liver, pancreas, spleen and intestine, BRAZIL (Rio Grande do Sul State) (Mascarenhas & Müller, 2015a).

Eustrongylides Jägerskiöld, 1909

Eustrongylides sp. (larvae)

Trachemys dorbigni (Duméril & Bibron, 1835), stomach (serous), BRAZIL (Rio Grande do Sul State) (Mascarenhas, 2014).

Superfamily Strongyloidea Weinland, 1858

Family Strongylidae Baird, 1853

Chapiniella Yamaguti, 1961

Chapiniella variabilis (Chapin, 1924)

Chelonoidis carbonarius (Spix, 1824), large intestine, BRAZIL (Piauí State) (Freire *et al.*, 2017; Freire *et al.*, 2019).

Chelonoidis denticulatus (Linnaeus, 1766), intestine, BRAZIL (Pará State) (Chapin, 1924).

Chelonoidis denticulatus (Linnaeus, 1766), large intestine, BRAZIL (Piauí State) (Freire *et al.*, 2017; Freire *et al.*, 2019).

***Sauricola* Chapin, 1924**

***Sauricola sauricola* Chapin, 1924**

Chelonoidis denticulatus (Linnaeus, 1766), intestine, BRAZIL (Pará State) (Chapin, 1924).

Superfamily Oxyuroidea Railliet, 1916

Family Pharyngodonidae Travassos, 1919

***Thelandros* Wedl, 1862**

***Thelandros* sp.**

Chelonoidis carbonarius (Spix, 1824), intestine, VENEZUELA (Bolivar State) (Pérez Mata *et al.*, 2014).

Pharyngodonidae gen. sp.

Acanthochelys spixii (Duméril & Bibron, 1835), large intestine, BRAZIL (Rio Grande do Sul State) (present study, CHLAPASIL, 889).

Superfamily Cosmoceroidea Skrjabin & Shikhobalova, 1951

Family Kathlaniidae (Lane, 1914)

***Falcaustra* Lane, 1915**

***Falcaustra affinis* (Leidy, 1856)**

Trachemys dorbigni (Duméril & Bibron, 1835), large intestine, heart, kidney, stomach, BRAZIL (Rio Grande do Sul State) (Mascarenhas & Müller, 2015b).

***Falcaustra tikasinghi* (Schroeder, Schmidt & Everard, 1977)**

Rhinoclemmys annulata (Gray, 1860), digestive tract, ECUADOR (São Jose de Tagua, and Playa Grande) (Dyer & Carr, 1990a).

Rhinoclemmys melanosterna (Gray, 1861), digestive tract, ECUADOR (Rio Bogotá) (Dyer & Carr, 1990a).

Rhinoclemmys nasuta (Boulenger, 1902), digestive tract, ECUADOR (Sarria, Estero el Ceibo, and Playa Grande) (Dyer & Carr, 1990a).

Rhinoclemmys punctularia (Daudin, 1801), unspecified site of infection, BRAZIL (Pará State) (Baker & Bain, 1981).

***Falcaustra* sp.**

Chelonoidis chilensis (Gray, 1870), small intestine, ARGENTINA (San Juan Province) (Castillo *et al.*, 2020).

Family Atractidae Travassos, 1919

***Atractis* Dujardin, 1845**

***Atractis caballeroi* Brenes & Bravo-Hollis, 1960**

Kinosternon leucostomum Duméril & Bibron, 1851, digestive tract, ECUADOR (Rio Bogotá) (Dyer & Carr, 1990a).

Rhinoclemmys annulata (Gray, 1860), digestive tract, ECUADOR (Playa Grande) (Dyer & Carr, 1990a).

***Atractis cruciata* Linstow, 1902**

Podocnemis expansa (Schweigger, 1812), stomach, BRAZIL (Tocantins State) (Armond, 2008).

***Atractis dactyluris* Rudolphi 1819**

Mesoclemmys nasuta (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Diesing, 1851).

Peltocephalus dumerilianus (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Diesing, 1851).

Podocnemis expansa (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Diesing, 1851).

***Atractis impura* (Caballero, 1944)**

Chelonoidis denticulatus (Linnaeus, 1766), intestine, PERU (Loreto and Ucayali Department) (Salizar & Sanchez, 2007).

Rhinoclemmys diademata (Mertens, 1954), digestive tract, VENEZUELA (Lake Maracaib basin) (Dyer & Carr, 1990a).

***Atractis marquezii* Bursey & Flanagan 2002**

Chelonoidis porteri (Rothschild, 1903), colon, ECUADOR (Isla Santa Cruz, Galapagos) (Bursey & Flanagan, 2002).

***Atractis thapari* Petter, 1966**

Chelonoidis carbonarius (Spix, 1824), small and large intestines, BRAZIL (Piauí State) (Leal *et al.*, 2018; Freire *et al.*, 2019).

Chelonoidis denticulatus (Linnaeus, 1766), small and large intestines, BRAZIL (Piauí State) (Leal *et al.*, 2018; Freire *et al.*, 2019).

***Atractis trematophila* Travassos, 1934**

Amazon river turtle, digestive tract of *Nematophila grande* (Digenea), BRAZIL (unspecified locality) (Travassos, 1934a).

Peltocephalus dumerilianus (Schweigger, 1812),

stomach, small and large intestine, BRAZIL (Amazonas State) (Ferreira, 2016).

***Atractis* sp.**

Podocnemis expansa (Schweigger, 1812), stomach, BRAZIL (Tocantins State) (Armond, 2008).

***Atractis* sp.**

Chelonoidis carbonarius (Spix, 1824), intestine, VENEZUELA (Bolivar State) (Pérez Mata *et al.*, 2014).

***Atractis* sp.**

Chelonoidis porteri (Rothschild, 1903), intestine, ECUADOR (Isla Santa Cruz, Galapagos) (Fournié *et al.*, 2015).

***Buckleyattractis* Khalil & Gibbons 1988**

***Buckleyattractis marinkelli* Khalil & Gibbons 1988**

Podocnemis unifilis Troschel, 1848, large intestine, COLOMBIA (unspecified locality) (Khalil & Gibbons, 1988).

***Labiduris* Schneider, 1866**

***Labiduris gulosa* (Rudolphi, 1819)**

Chelonoidis denticulatus (Linnaeus, 1766), intestine, BRAZIL (Pará State) (Chapin, 1924).

Mesoclemmys nasuta (Schweigger, 1812), intestine, BRASIL (unspecified locality) (Diesing, 1851).

***Labiduris irineuta* Costa, 1961**

Chelonoidis denticulatus (Linnaeus, 1766), intestine, BRAZIL (Rio de Janeiro State) (Costa, 1961 cited by Vicente *et al.*, 1993).

***Labiduris zschokkei* Linstow, 1899**

Chelonoidis denticulatus (Linnaeus, 1766), intestine, BRAZIL (unspecified locality) (Skrjabin *et al.*, 1964 cited by Vicente *et al.*, 1993).

***Labiduris* sp.**

Chelonoidis porteri (Rothschild, 1903), intestine, ECUADOR (Isla Santa Cruz, Galapagos) (Fournié *et al.*, 2015).

***Labiduris* sp.**

Chelonoidis chilensis (Gray, 1870), small intestine, ARGENTINA (San Juan Province) (Castillo *et al.*, 2020).

***Klossinemella* Costa, 1961**

***Klossinemella conciliatus* Alho, 1964**

Peltocephalus dumerilianus (Schweigger 1812), stomach, small and large intestine, BRAZIL (Amazonas State) (Ferreira, 2016).

Podocnemis expansa (Schweigger, 1812), stomach, BRAZIL (Amazonas State) (Alho 1964a; Costa *et al.*, 1968).

Podocnemis expansa (Schweigger, 1812), stomach, BRAZIL (Tocantins State) (Armond, 2008).

Podocnemis unifilis Troschel, 1848, stomach, PERU (Samiria river) (Salizar & Sanchez, 2007).

***Klossinemella travassosi* Costa, Mota & Gomes, 1968**

Chelonoidis denticulatus (Linnaeus, 1766), large intestine, BRAZIL (Amazonas State) (Costa *et al.*, 1968; Muniz-Pereira *et al.*, 2009).

***Klossinemella* sp.**

Peltocephalus dumerilianus (Schweigger, 1812), stomach, small and large intestine, BRAZIL (Amazonas State) (Ferreira, 2016).

***Klossinemella* sp.**

Peltocephalus dumerilianus (Schweigger, 1812), stomach, small and large intestine, BRAZIL (Amazonas State) (Ferreira, 2016).

***Klossinemella* sp.**

Peltocephalus dumerilianus (Schweigger, 1812), stomach, small and large intestine, BRAZIL (Amazonas State) (Ferreira, 2016).

***Orientattractis* Petter, 1966**

***Orientattractis leiperi* Buckley, 1969**

Podocnemis vogli Müller, 1935, "stomach" (presumably colon), COLOMBIA (unspecified locality) (Buckley, 1969).

Podocnemis unifilis Troschel, 1848, stomach, BRAZIL (Tocantins River, Pará State) (Jesus *et al.*, 2020).

***Paraorientattractis* Gibbons, Khalil & Marinkelle, 1997**

***Paraorientattractis semiannulata* Gibbons, Khalil & Marinkelle, 1997**

Podocnemis unifilis Troschel, 1848, large intestine, BRAZIL (Cuminá and Trombetas rivers near Pará State) (Gibbons *et al.*, 1997).

Podocnemis unifilis Troschel, 1848, intestine,

PERU (Ucayali Department) (Salizar & Sanchez, 2007).

***Paratractis* Sarmiento, 1959**

***Paratractis hystrix* (Diesing, 1851)**

Peltocephalus dumerilianus (Schweigger, 1812), intestine, PERU (Pucallpa, Ucayali Department) (Sarmiento, 1959).

Peltocephalus dumerilianus (Schweigger, 1812), stomach, small and large intestine, BRAZIL (Amazonas State) (Ferreira, 2016).

Podocnemis erythrocephala (Spix, 1824), intestine, BRAZIL (Amazonas State) (Diesing, 1851).

Podocnemis expansa (Schweigger, 1812), large intestine COLOMBIA (unspecified locality) (Khalil & Gibbons, 1988).

Podocnemis unifilis Troschel, 1848, large intestine, COLOMBIA (unspecified locality) (Khalil & Gibbons, 1988).

Podocnemis vogli Müller, 1935, unspecified site of infection, COLOMBIA (unspecified locality) (Buckley, 1969; Buckley, 1970).

Podocnemis vogli Müller, 1935, large intestine COLOMBIA (unspecified locality) (Khalil & Gibbons, 1988).

***Pneumoatractis* Bursey, Reavill & Greiner, 2009**

***Pneumoatractis podocnemis* Bursey, Reavill & Greiner, 2009**

Podocnemis unifilis Troschel, 1848, lungs, South America (Unknown, wild-caught, confiscated South America turtle) (Bursey *et al.*, 2009).

***Podocnematractis* Gibbons, Khalil & Marinkelle, 1995**

***Podocnematractis colombiaensis* Gibbons, Khalil & Marinkelle, 1995**

Podocnemis expansa (Schweigger, 1812), large intestine, COLOMBIA (unspecified locality) (Gibbons *et al.*, 1995).

Podocnemis vogli Müller, 1935, large intestine, COLOMBIA (unspecified locality) (Gibbons *et al.*, 1995).

***Podocnematractis ortleppi* (Thapar, 1925)**

Podocnemis expansa (Schweigger, 1812), large intestine, COLOMBIA (unspecified locality) (Gibbons *et al.*, 1995).

Podocnemis unifilis Troschel, 1848, large intestine, COLOMBIA (unspecified locality) (Gibbons *et al.*, 1995).

Podocnemis vogli Müller, 1935, large intestine, COLOMBIA (unspecified locality) (Gibbons *et al.*, 1995).

Superfamily Ascaridoidea Railliet & Henry, 1915

Family Anisakidae Skrjabin & Karokhin, 1945

***Contracaecum* Railliet & Henry, 1912**

***Contracaecum* sp. (larvae)**

Acanthochelys spixii (Duméril & Bibron, 1835), unspecified site of infection, BRAZIL (Rio Grande do Sul State) (Mascarenhas *et al.*, 2017).

Family Ascarididae Baird, 1853

***Angusticaecum* Baylis, 1920**

***Angusticaecum brevispiculum* Chapin, 1924**

Chelonoidis denticulatus (Linnaeus, 1766), intestine, BRAZIL (Pará State) (Chapin, 1924).

Chelonoidis denticulatus (Linnaeus, 1766), intestine, PERU (Loreto and Ucayali Department) (Salizar & Sanchez, 2007).

***Brevimulticaecum* Mozgovoy, 1951 in Skrjabin, Shikhobalova & Mozgovoi, 1952**

***Brevimulticaecum* sp. (larvae)**

Phrynops geoffroanus (Schweigger, 1812), small intestine, BRAZIL (São Paulo State) (Silva, 2014).

Superfamily Camallanoidea Travassos, 1920

Family Camallanidae Railliet & Henry, 1915

***Camallanus* Railliet & Henry, 1915**

***Camallanus emydidius* Mascarenhas & Müller, 2017**

Hydromedusa tectifera Cope, 1870, small intestine, BRAZIL (Rio Grande do Sul State) (Mascarenhas *et al.*, 2013; Chaviel *et al.*, 2020).

Trachemys dorbigni (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State), (Mascarenhas & Müller, 2017).

***Camallanus kachugae* Baylis & Daubney, 1922**

Kinosternon scorpioides (Linnaeus, 1766), intestine, VENEZUELA (Zulia State) (Díaz-Ungría, 1978).

***Camallanus* sp.**

Phrynops hilarii (Duméril & Bibron, 1835), stomach and small intestine, BRAZIL (Rio Grande do Sul State) (Bernardon *et al.*, 2013).

***Camallanus* sp.**

Trachemys dorbigni (Duméril & Bibron, 1835),

small intestine, BRAZIL (Rio Grande do Sul State) (Bernardon *et al.*, 2014).

***Camallanus* sp.**

Acanthochelys spixii (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (Mascarenhas *et al.*, 2013).

***Camallanus* sp.**

Phrynops geoffroanus (Schweigger, 1812), small intestine, BRAZIL (Minas Gerais State) (Vieira *et al.*, 2016).

***Serpinema* Yeh, 1960**

***Serpinema amazonicus* (Ribeiro, 1940)**

Podocnemis expansa (Schweigger, 1812), small intestine, BRAZIL (Pará State) (Ribeiro, 1940).

Podocnemis expansa (Schweigger, 1812), intestine, PERU (Loreto Department) (Tantaleán, 1998).

Podocnemis unifilis Troschel, 1848, small intestine, PERU (Loreto Department) (Sánchez *et al.*, 2006).

***Serpinema cayennensis* Harnoster, Svitin & Preez, 2019**

Rhinoclemmys punctularia (Daudin, 1801), intestine, FRENCH GUIANA (Cayenne) (Harnoster *et al.*, 2019).

***Serpinema maghati* (Sprehn, 1932)**

Kinosternon integrum Le Conte, 1854, intestine, BOLIVIA (unspecified locality) (Sprehn, 1932).

Kinosternon scorpioides (Linnaeus, 1766), small intestine, BRAZIL (Pernambuco, and Pará States) (Alho, 1965; Freitas & Dobbin Jr., 1971).

Kinosternon scorpioides (Linnaeus, 1766), stomach, small and large intestine, BRAZIL (Maranhão State) (Viana *et al.*, 2016).

***Serpinema microcephalus* (Dujardin, 1845)**

Peltocephalus dumerilianus (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Diesing, 1851).

Podocnemis expansa (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Diesing, 1851).

***Serpinema monospiculatus* Freitas & Dobbin Jr., 1962**

Kinosternon scorpioides (Linnaeus, 1766), large intestine, BRAZIL (Ceará State) (Pereira *et al.*,

2018).

Mesoclemmys nasuta (Schweigger, 1812), small intestine, BRAZIL (Pernambuco State) (Freitas & Dobbin Jr., 1971).

Mesoclemmys turbeculata (Lüderwaldt, 1926), small intestine, BRAZIL (Pernambuco State) (Freitas & Dobbin Jr., 1971).

Mesoclemmys turbeculata (Lüderwaldt, 1926), small and large intestines, BRAZIL (Ceará State) (Pereira *et al.*, 2018).

Phrynops geoffroanus (Schweigger, 1812), small intestine, BRAZIL (Pernambuco State) (Freitas & Dobbin Jr., 1971).

Phrynops geoffroanus (Schweigger, 1812), small intestine, BRAZIL (São Paulo State) (Silva, 2014).

Phrynops geoffroanus (Schweigger, 1812), stomach, small and large intestines, lungs, body cavity BRAZIL (Ceará State) (Pereira *et al.*, 2018).

***Spirocamallanus* Olsen, 1952**

***Spirocamallanus* sp.**

Hydromedusa tectifera Cope, 1870, small intestine, BRAZIL (Minas Gerais State) (Novelli *et al.*, 2014).

Superfamily Gnathostomatoidea Railliet, 1895

Family Gnathostomatidae Railliet, 1895

***Ancyracanthus* Diesing, 1858**

***Ancyracanthus pinnatifidus* Diesing, 1839**

Peltocephalus dumerilianus (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Diesing, 1851).

Peltocephalus dumerilianus (Schweigger, 1812), stomach and intestine, BRAZIL (unspecified locality) (Gomes & Kohn, 1970 cited by Vicente *et al.*, 1993).

Peltocephalus dumerilianus (Schweigger, 1812), stomach, BRAZIL (Amazonas State) (Ferreira, 2016).

Podocnemis expansa (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Diesing, 1851).

Podocnemis unifilis Troschel, 1848, small intestine, PERU (Loreto Department) (Sánchez *et al.*, 2006).

***Gnathostoma* Owen, 1836**

***Gnathostoma* sp. (larvae)**

Hydromedusa tectifera Cope, 1870, small intestine, BRAZIL (Rio Grande do Sul State) (present study, CHLAPASIL 881).

***Spiroxys* Schneider, 1866**

***Spiroxys contortus* (Rudolphi, 1819)**

Acanthochelys spixii (Duméril & Bibron, 1835), stomach, BRAZIL (Rio Grande do Sul State) (Mascarenhas *et al.*, 2013).

Hydromedusa tectifera Cope, 1870, esophagus, stomach, small and large intestines, and cavity, BRAZIL (Rio Grande do Sul State) (Mascarenhas *et al.*, 2013).

Phrynosops hilarii (Duméril & Bibron, 1835), stomach, ARGENTINA (Buenos Aires Province) (Palumbo *et al.*, 2016).

Phrynosops hilarii (Duméril & Bibron, 1835), stomach, small and large intestines, BRAZIL (Rio Grande do Sul State) (Chaviel *et al.*, 2020).

Trachemys dorbigni (Duméril & Bibron, 1835), esophagus, stomach, small and large intestines, heart, BRAZIL (Rio Grande do Sul State) (Mascarenhas & Müller, 2015b).

***Spiroxys figueiredoi* Freitas & Dobbin Jr., 1962**

Kinosternon scorpioides (Linnaeus, 1766), stomach, BRAZIL (Pará State) (Alho, 1965).

Kinosternon scorpioides (Linnaeus, 1766), stomach, BRAZIL (Pernambuco State) (Freitas & Dobbin Jr., 1962; Freitas & Dobbin Jr., 1971).

Kinosternon scorpioides (Linnaeus, 1766), stomach, small and large intestine, BRAZIL (Maranhão State) (Viana *et al.*, 2016).

Mesoclemmys turbeculata (Lüderwaldt, 1926), stomach, small intestine, BRAZIL (Ceará State) (Pereira *et al.*, 2018).

Phrynosops geoffroanus (Schweigger, 1812), stomach, BRAZIL (Ceará State) (Pereira *et al.*, 2018).

Phrynosops geoffroanus (Schweigger, 1812), stomach, BRAZIL (São Paulo State) (Silva, 2014).

***Spiroxys* sp.**

Mesoclemmys vanderhaegei (Bour, 1973), stomach, BRAZIL (Mato Grosso State) (Ávila *et al.*, 2010).

***Spiroxys* sp.**

Phrynosops hilarii (Duméril & Bibron, 1835), stomach and small intestine, BRAZIL (Rio Grande do Sul State) (Bernardon *et al.*, 2013).

***Spiroxys* sp.**

Trachemys dorbigni (Duméril & Bibron, 1835), stomach and small intestine, BRAZIL (Rio Grande do Sul State) (Bernardon *et al.*, 2014).

Superfamily Physalopteroidea Sobolev 1949**Family Physalopteridae Leiper, 1908*****Physaloptera* Rudolphi, 1819*****Physaloptera retusa* Rudolphi, 1819**

Mesoclemmys turbeculata (Lüderwaldt, 1926), large intestine, BRAZIL (Ceará State) (Pereira *et al.*, 2018).

Phrynosops geoffroanus (Schweigger, 1812), stomach, small intestine, BRAZIL (Ceará State) (Pereira *et al.*, 2018).

***Physaloptera* sp. (larvae)**

Acanthochelys spixii (Duméril & Bibron, 1835), stomach, BRAZIL (Rio Grande do Sul State) (Chaviel *et al.*, 2020).

***Physaloptera* sp. (larvae)**

Phrynosops geoffroanus (Schweigger, 1812), stomach, BRAZIL (São Paulo State) (Silva, 2014).

Superfamily Habronematoidea Railliet & Henry, 1915**Family Hedruridae Railliet, 1916*****Hedruris* Nitzsch, 1821*****Hedruris dratini* Palumbo, Servián, Sánchez & Díaz, 2019**

Hydromedusa tectifera Cope, 1870, stomach, ARGENTINA (Buenos Aires Province) (Palumbo *et al.*, 2019).

Phrynosops hilarii (Duméril & Bibron, 1835), stomach, ARGENTINA (Buenos Aires Province) (Palumbo *et al.*, 2019).

***Hedruris orestiae* (Moniez, 1889)**

Hydromedusa tectifera Cope, 1870, stomach, ARGENTINA (Buenos Aires Province) (Palumbo *et al.*, 2016).

Phrynosops hilarii (Duméril & Bibron, 1835), stomach, ARGENTINA (Buenos Aires Province) (Palumbo *et al.*, 2016).

***Hedruris* sp.**

Rhinoclemmys nasuta (Boulenger, 1902), stomach, ECUADOR (Estero el Ceibo) (Dyer & Carr, 1990a).

Phylum Platyhelminthes Gegenbaur, 1859**Class Trematoda Rudolphi, 1808****Subclass Digenea Carus, 1863****Superfamily Diplostomoidea Poirier, 1886****Family Proterodiplostomidae Dubois, 1936*****Cheloniodiplostomum* Sudaricov, 1960*****Cheloniodiplostomum argentinensis* Palumbo &**

Diaz, 2018

Phrynos hiliarii (Duméril & Bibron, 1835), anterior portion of intestine, ARGENTINA (Buenos Aires Province) (Palumbo & Diaz, 2018).

***Cheloniodiplostomum brevis* (MacCallum, 1921)**

Phrynos geoffroanus (Schweigger, 1812), unspecified site of infection, COLOMBIA (unspecified locality) (Dubois, 1979).

***Cheloniodiplostomum testudinis* (Dubois, 1936)**

Hydromedusa tectifera Cope, 1870, anterior portion of intestine, ARGENTINA (Buenos Aires Province) (Palumbo *et al.*, 2018).

Phrynos geoffroanus (Schweigger, 1812), small and large intestines, BRAZIL (São Paulo State) (Silva, 2014).

Phrynos hiliarii (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (Mascarenhas *et al.*, 2016).

Phrynos hiliarii (Duméril & Bibron, 1835), intestine, ARGENTINA (Corrientes Province) (Lombardero & Moriena, 1977).

Phrynos hiliarii (Duméril & Bibron, 1835), anterior portion of intestine, ARGENTINA (Buenos Aires Province) (Palumbo *et al.*, 2018).

Testudo sp., unspecified site of infection, BRAZIL (unspecified locality) (Dubois 1936 cited by Fernandes & Kohn, 2014).

***Cheloniodiplostomum* sp.**

Phrynos hiliarii (Duméril & Bibron, 1835), stomach and small intestine, BRAZIL (Rio Grande do Sul State) (Bernardon *et al.*, 2013).

***Cheloniodiplostomum* sp.**

Phrynos geoffroanus (Schweigger, 1812), small intestine, BRAZIL (Minas Gerais State) (Novelli *et al.*, 2013).

***Cheloniodiplostomum* sp.**

Acanthochelys spixii (Duméril & Bibron, 1835), small and large intestine, BRAZIL (Rio Grande do Sul State) (Mascarenhas *et al.*, 2016).

***Cheloniodiplostomum* sp.**

Trachemys dorbigni (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (Bernardon *et al.*, 2014).

***Cheloniodiplostomum* sp.**

Hydromedusa tectifera Cope, 1870, small

intestine, BRAZIL (Rio Grande do Sul State) (present study, CHLAPASIL 885).

Superfamily Schistosomatoidea Stiles & Hassall, 1898**Family Spirorchiidae Stunkard, 1921*****Atamatam* Bullard & Roberts, 2019*****Atamatam amazoniensis* Bullard & Roberts, 2019**

Chelus fimbriata (Schneider, 1783), blood vessels of kidney and mesentery, PERU (Iquitos Department) (Bullard *et al.*, 2019).

Paratamatam* Bullard & Roberts, 2019**Paratamatam iquitosiensis* Bullard & Roberts, 2019**

Chelus fimbriata (Schneider, 1783), blood vessels of kidney and mesentery, PERU (Iquitos Department) (Bullard *et al.*, 2019).

Superfamily Echinostomatoidea Looss, 1899**Family Echinostomatidae Looss, 1899*****Prionosomoides* Freitas & Dobbin Jr., 1967*****Prionosomoides phrynopsis* (Mañé-Garzón & Gil, 1961)**

Phrynos hiliarii (Duméril & Bibron, 1835), small intestine, URUGUAY (Tacuarembó Department) (Mañé-Garzón & Gil, 1961a).

***Prionosomoides scalaris* Freitas & Dobbin Jr., 1967**

Phrynos geoffroanus (Schweigger, 1812), small intestine, BRAZIL (Pernambuco State) (Freitas & Dobbin Jr., 1967).

Phrynos hiliarii (Duméril & Bibron, 1835), esophagus, ARGENTINA (Corrientes Province) (Lombardero & Moriena, 1977).

***Prionosomoides* sp.**

Phrynos hiliarii (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (present study, CHLAPASIL, 886-887).

Family Rhytidodidae Odhner, 1926***Rhytidodes* Looss, 1901*****Rhytidodes gelatinosus* (Rudolphi, 1819)**

Podocnemis expansa (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Travassos *et al.*, 1969).

Superfamily Heronimoidea Ward, 1917**Family Heronimidae Ward, 1917**

Heronimus MacCallum, 1902***Heronimus mollis* (Leidy, 1856)**

Trachemys callirostris (Gray, 1856), lungs, COLOMBIA (unspecified locality) (Lenis & Vélez, 2011).

Superfamily Microscaphidioidea Looss, 1900**Family Microscaphidiidae Looss, 1900*****Neodeuterobaris* Brooks, 1976*****Neodeuterobaris pritchardae* Brooks, 1976**

Podocnemis lewyana Duméril, 1852, stomach, COLOMBIA (Caldas Departament) (Brooks, 1976).

Podocnemis lewyana Duméril, 1852, stomach, COLOMBIA (Magdalena river) (Lenis & Vélez, 2011).

Octangioides* Price, 1937**Octangioides tlacotalpensis* Caballero, 1942**

Rhinoclemmys nasuta (Boulenger, 1902), large intestine, ECUADOR (Esmeraldas Province) (Dyer & Carr, 1990b).

Podocnemitrema* Alho & Vicente, 1964**Podocnemitrema papillosus* Alho & Vicente, 1964**

Podocnemis expansa (Schweigger, 1812), stomach, BRAZIL (Amazonas State) (Alho & Vicente, 1964).

Podocnemis expansa (Schweigger, 1812), digestive tract, PERU (Iquitos Departament) (Tantaleán *et al.*, 2011).

Podocnemis unifilis Troschel, 1848, digestive tract, PERU (Iquitos Departament) (Tantaleán *et al.*, 2011).

Superfamily Paramphistomatoidea Fiscoeder, 1901**Family Cladorchiidae Fiscoeder, 1901*****Halltrema* Lent & Freitas, 1939*****Halltrema avitellina* Lent & Freitas, 1939**

Chelonoidis denticulatus (Linnaeus, 1766), stomach, BRAZIL (Pará State) (Alho, 1965).

Podocnemis expansa (Schweigger, 1812), stomach, BRAZIL (Tocantins State) (Armond, 2008).

Podocnemis expansa (Schweigger, 1812), unspecified site of infection, BRAZIL (Pará State) (Lent & Freitas, 1939; Freitas & Lent, 1942 cited by Fernandes & Kohn, 2014).

Podocnemis expansa (Schweigger, 1812), digestive tract, PERU (Iquitos Departament)

(Tantaleán *et al.*, 2011).

Podocnemis unifilis Troschel, 1848, digestive tract, PERU (Iquitos Departament) (Tantaleán *et al.*, 2011).

Podocnemis sp., unspecified site of infection, VENEZUELA (unspecified locality) (Caballero & Diaz-Ungria, 1958 cited by Fernandes & Kohn, 2014).

***Halltrema heteroxenus* (Cordero & Vogelsang, 1940)**

Podocnemis unifilis Troschel, 1848, digestive tract, PERU (Loreto Departament) (Tantaleán & Forlong, 2013).

Podocnemis sp., stomach, VENEZUELA (Guarico State) (Cordero & Vogelsang, 1940).

Rhinoclemmys nasuta (Boulenger, 1902), digestive tract, ECUADOR (Esmeraldas Province) (Dyer & Carr, 1990b).

Nematophila* Travassos, 1934**Nematophila argentinum* (Cordero & Vogelsang, 1940)**

Phrynops sp., intestine, ARGENTINA (Misiones Province) (Cordero & Vogelsang, 1940).

Podocnemis lewyana Duméril, 1852, large intestine, COLOMBIA (Bolívar Departament) (Lenis & Vélez, 2011).

Trachemys callirostris (Gray, 1856), large intestine, COLOMBIA (Bolívar Departament) (Lenis & Vélez, 2011).

***Nematophila grandis* (Diesing, 1839)**

Chelus fimbriata (Schneider, 1783), intestine, BRAZIL (unspecified locality) (Travassos, 1934b; Travassos *et al.*, 1969).

Hydraspis schopfii, intestine, BRAZIL (unspecified locality) (Travassos, 1934b).

Hydromedusa tectifera Cope, 1870, unspecified site of infection, PARAGUAY (unspecified locality) (Masi-Pallarés *et al.*, 1976 cited by Fernandes & Kohn, 2014).

Kinixys erosa (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Travassos *et al.*, 1969; Fernandes & Kohn, 2014).

Kinosternon scorpioides (Linnaeus, 1766), small and large intestine, BRAZIL (Pará State) (Alho, 1964b).

Kinosternon scorpioides (Linnaeus, 1766), stomach, VENEZUELA (Zulia State) (Díaz-Ungria, 1978).

Mesoclemmys gibba (Schweigger, 1812), intestine,

BRAZIL (unspecified locality) (Travassos, 1934b; Travassos *et al.*, 1969).

Mesoclemmys nasuta (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Travassos, 1934b; Travassos *et al.*, 1969).

Peltocephalus dumerilianus (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Travassos, 1934b; Travassos *et al.*, 1969).

Peltocephalus dumerilianus (Schweigger, 1812), stomach, small and large intestine, BRAZIL (Amazonas State) (Ferreira, 2016).

Phrynops geoffroanus (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Travassos, 1934b; Travassos *et al.*, 1969).

Phrynops geoffroanus (Schweigger, 1812), large intestine, BRAZIL (São Paulo State) (Silva, 2014).

Phrynops hilarii (Duméril & Bibron, 1835), intestine, ARGENTINA (Corrientes Province) (Lombardero & Moriena, 1977).

Podocnemis expansa (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Travassos *et al.*, 1969).

Podocnemis expansa (Schweigger, 1812), stomach, PERU (Loreto Department) (Tantaleán *et al.*, 2011).

Podocnemis expansa (Schweigger, 1812), stomach, VENEZUELA (Zulia State) (Díaz-Ungria, 1978).

Podocnemis erythrocephala (Spix, 1824), unspecified site of infection, BRAZIL (unspecified locality) (Diesing, 1850 cited by Fernandes & Kohn, 2014).

Podocnemis unifilis Troschel, 1848, stomach, and intestine, PERU (Loreto, and Madre de Dios Departments) (Salizar & Sanchez, 2004).

Podocnemis unifilis Troschel, 1848, stomach, and large intestine, PERU (Loreto Department) (Sánchez *et al.*, 2006).

Podocnemis unifilis Troschel, 1848, stomach, PERU (Loreto Department) (Tantaleán *et al.*, 2011).

Podocnemis unifilis Troschel, 1848, unspecified site of infection, VENEZUELA (unspecified locality) (Heyneman *et al.*, 1960 cited by Fernandes & Kohn, 2014).

Podocnemis vogli Müller, 1935, unspecified site of infection, VENEZUELA (unspecified locality) (Heyneman *et al.*, 1960 cited by Fernandes & Kohn, 2014).

Podocnemis sp., unspecified site of infection, VENEZUELA (unspecified locality) (Caballero & Diaz-Ungria, 1958 cited by Fernandes & Kohn,

2014).

Rhinoclemmys nasuta (Boulenger, 1902), small and large intestines, ECUADOR (Esmeraldas Province) (Dyer & Carr, 1990b).

Rhinoclemmys punctularia (Daudin, 1801), large intestine, BRAZIL (Pará State) (Alho, 1964b).

Rhinoclemmys punctularia (Daudin, 1801), digestive tract, GUYANA FRANCESA (Iracoubo) (Dyer & Carr, 1990b).

***Nematophila venezuelensis* (Cordero & Vogelsang, 1940)**

Podocnemis lewyana Duméril, 1852, stomach, COLOMBIA (Bolívar and Magdalena Departments) (Lenis & Vélez, 2011).

Podocnemis sp., stomach, VENEZUELA (Guarico, and Bolívar State) (Cordero & Vogelsang, 1940).

***Oriximinatrema* Knoff, Brooks, Mullins & Gomes, 2012**

***Oriximinatrema noronhae* Knoff, Brooks, Mullins & Gomes, 2012**

Podocnemis expansa (Schweigger, 1812), stomach and intestine, BRAZIL (Pará State) (Knoff *et al.*, 2012).

***Pseudocleptodiscus* Caballero, 1961**

***Pseudocleptodiscus margaritae* Caballero, 1961**

Rhinoclemmys nasuta (Boulenger, 1902), small and large intestines, ECUADOR (Esmeraldas Province) (Dyer & Carr, 1990b).

***Pseudonematophila* Lenis & Vélez, 2011**

***Pseudonematophila ovalis* (Cordero & Vogelsang, 1940)**

Podocnemis sp., stomach, VENEZUELA (Guárico State) (Cordero & Vogelsang, 1940).

Podocnemis lewyana Duméril, 1852, stomach, COLOMBIA (Bolívar and Magdalena Departments) (Lenis & Vélez, 2011).

Superfamily Allocreadioidea Looss, 1902

Family Opecoleidae Ozaki, 1925

***Helicotrema* Odhner, 1902**

***Helicotrema spirale* (Diesing, 1850)**

Chelonoidis denticulatus (Linnaeus, 1766), small intestine, PERU (Iquitos Department) (Tantaleán & Forlong, 2013).

Chelonoidis denticulatus (Linnaeus, 1766), intestine, BRAZIL (unspecified locality) (Odhner, 1912 cited by Fernandes & Kohn, 2014).

Peltocephalus dumerilianus (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Odhner, 1912 cited by Fernandes & Kohn 2014).

Peltocephalus dumerilianus (Schweigger, 1812), small intestine, BRAZIL (Amazonas State) (Ferreira, 2016).

Superfamily Opisthorchioidea Looss, 1899

Family Cryptogonimidae Ward, 1917

***Acanthostomum* Looss, 1899**

***Acanthostomum scyphocephalus* (Braun, 1899)**

Chelus fimbriata (Schneider, 1783), intestine, BRAZIL (unspecified locality) (Ostrowski de Núñez, 1986).

***Caimanicola* Freitas & Lent, 1938**

***Caimanicola brauni* (Mañé-Garzón & Gil, 1961)**

Acanthochelys spixii (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (Chaviel *et al.*, 2020).

Phrynops hilarii (Duméril & Bibron, 1835), small intestine, URUGUAY (Tacuarembó Department) (Mañé-Garzón & Gil, 1961a).

Phrynops hilarii (Duméril & Bibron, 1835), ARGENTINA (Ostrowski de Núñez 1987 [experimental study] cited by Fernandes & Kohn, 2014).

Phrynops hilarii (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (Chaviel *et al.*, 2020).

***Timoniella* Rebecq, 1960**

***Timoniella ostrowski* Brooks & Holcman, 1993**

Phrynops hilarii (Duméril & Bibron, 1835), small intestine, URUGUAY (Tacuarembó Department) (Mañé-Garzón & Gil, 1961a; Brooks & Holcman, 1993).

Phrynops hilarii (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (Chaviel *et al.*, 2020).

Superfamily Gorgoderioidea Looss, 1899

Family Gorgoderidae Looss, 1899

***Gorgoderina* Looss, 1902**

***Gorgoderina* sp.**

Phrynops geoffroanus (Schweigger, 1812), small intestine, BRAZIL (Ceará State) (Pereira *et al.*, 2018).

Family Braunotrematidae Yamaguti, 1958

***Braunotrema* Price, 1930**

***Braunotrema pulvinatum* (Braun, 1899)**

Podocnemis expansa (Schweigger, 1812), small intestine, BRAZIL (Pará State) (Lent & Freitas, 1938).

Superfamily Plagiorchioidea Lühe, 1901

Family Telorchidae Looss, 1899

***Loefgrenia* Travassos, 1920**

***Loefgrenia loefgreni* Travassos, 1919**

Podocnemis unifilis Troschel, 1848, intestine, BRAZIL (unspecified locality) (Travassos, 1919 cited by Fernandes & Kohn, 2014).

***Pseudotelorchis* Yamaguti, 1971**

***Pseudotelorchis devincenzii* (Mañé-Garzón & Gil, 1961)**

Hydromedusa tectifera Cope, 1870, small intestine, URUGUAY (Canelones Department) (Mañé-Garzón & Gil, 1961b).

***Telorchis* Lühe, 1899**

***Telorchis achavali* Mañé-Garzón & Holcman-Spector, 1973**

Trachemys dorbigni (Duméril & Bibron, 1835), small intestine, URUGUAY (Tacuarembó Department) (Mañé-Garzón & Holcman-Spector, 1973).

Trachemys dorbigni (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (Mascarenhas & Müller, 2013).

***Telorchis aculeatus* (Linstow, 1879)**

Podocnemis unifilis Troschel, 1848, intestine, VENEZUELA (Sucre State) (Nasir, 1974).

***Telorchis bifurcus* (Braun, 1899)**

Podocnemis expansa (Schweigger, 1812), intestine, BRAZIL (unspecified locality) (Braun, 1901 cited by Fernandes & Kohn, 2014).

***Telorchis birabeni* Mañé-Garzón & Gil, 1961**

Phrynops hilarii (Duméril & Bibron, 1835), small intestine, URUGUAY (Tacuarembó Department) (Mañé-Garzón & Gil, 1961c).

Phrynops hilarii (Duméril & Bibron, 1835), small intestine, ARGENTINA (Corrientes Province) (Lombardero & Moriena, 1977).

Phrynops hilarii (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (Mascarenhas *et al.*, 2016).

Phrynops geoffroanus (Schweigger, 1812), small intestine, BRAZIL (São Paulo State) (Silva, 2014).

***Telorchis corti* Stunkard, 1915**

Trachemys callirostris (Gray, 1856), small intestine, COLOMBIA (unspecified locality) (Lenis & Vélez, 2011).

Trachemys dorbigni (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (Mascarenhas & Müller, 2013).

***Telorchis diaphanus* Freitas & Dobbin Jr., 1959**

Kinosternon scorpioides (Linnaeus, 1766), small intestine, BRAZIL (Pernambuco State) (Freitas & Dobbin Jr., 1959).

***Telorchis dubius* Mañé-Garzón & Holcman-Spector, 1968**

Trachemys dorbigni (Duméril & Bibron, 1835), small intestine, URUGUAY (Flores Department) (Mañé-Garzón & Holcman-Spector, 1968a).

***Telorchis hagmanni* Lent & Freitas, 1937**

Peltocephalus dumerilianus (Schweigger, 1812), small intestine, BRAZIL (Amazonas State) (Ferreira, 2016).

Podocnemis expansa (Schweigger, 1812), stomach, and small intestine, BRAZIL (Pará State) (Lent & Freitas, 1937; Alho, 1965).

Podocnemis lewyana Duméril, 1852, small intestine, COLOMBIA (Bolívar and Magdalena Departments) (Lenis & Vélez, 2011).

Podocnemis unifilis Troschel, 1848, digestive tract, PERU (Iquitos Department) (Tantaleán *et al.*, 2011).

***Telorchis parvus* Braun, 1901**

Emys orbicularis (Linnaeus, 1758), intestine, BRAZIL (unspecified locality) (Braun, 1901 cited by Fernandes & Kohn, 2014).

***Telorchis platensis* Mañé-Garzón & Gil, 1961**

Acanthochelys spixii (Duméril & Bibron, 1835), large intestine, BRAZIL (Rio Grande do Sul State) (Mascarenhas *et al.*, 2016).

Hydromedusa tectifera Cope, 1870, small intestine, URUGUAY (Canelones Department) (Mañé-Garzón & Gil, 1961b).

***Telorchis pleroticus* (Braun, 1899)**

Freshwater turtle, intestine, BRAZIL (unspecified locality) (Braun, 1901 cited by Fernandes & Kohn, 2014).

***Telorchis productus* Mañé-Garzón & Gil, 1961**

Phrynops hilarii (Duméril & Bibron, 1835), small

intestine, URUGUAY (Tacuarembó Department) (Mañé-Garzón & Gil, 1961b).

***Telorchis rapidulus* Dobbin Jr., 1957**

Kinosternon scorpioides (Linnaeus, 1766), small intestine, BRAZIL (Pernambuco State) (Dobbin Jr., 1957).

***Telorchis* sp.**

Hydromedusa tectifera Cope, 1870, small intestine, BRAZIL (Rio Grande do Sul State) (present study, CHLAPASIL 893-896).

***Telorchis* sp.**

Trachemys dorbigni (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (Mascarenhas, 2014).

Class Cestoda Van Beneden, 1849

Order Proteocephalidea Mola, 1928

Family Proteocephalidae La Rue, 1911

***Ophiotaenia* La Rue, 1911**

***Ophiotaenia cohospes* Cordero, 1946**

Hydromedusa tectifera Cope, 1870, intestine, URUGUAY (Montevideo) (Cordero 1946).

***Ophiotaenia lopesi* Rego, 1967**

Chelonoidis denticulatus (Linnaeus, 1766), small intestine, BRAZIL (Pará State) (Schmidt, 1986; Muniz-Pereira *et al.*, 2009).

***Ophiotaenia* sp.**

Hydromedusa tectifera Cope, 1870, small intestine, BRAZIL (Rio Grande do Sul State) (present study, CHLAPASIL, 890-892).

Class Monogenoidea Bychowsky, 1937

Order Polystomatidea Lebedev, 1988

Family Polystomatidae Gamble, 1896

***Polystomoides* Ward, 1917**

***Polystomoides brasiliensis* Vieira, Noveli, Sousa & Souza-Lima, 2008**

Hydromedusa maximiliani (Mikan, 1820), buccal and pharyngeal cavities, BRAZIL (Minas Gerais State) (Vieira *et al.*, 2008).

Mesoclemmys turbeculata (Lüderwaldt, 1926), buccal and pharyngeal cavities, BRAZIL (Sergipe State) (Santana *et al.*, 2019).

Phrynops geoffroanus (Schweigger, 1812), buccal and pharyngeal cavities, BRAZIL (Minas Gerais State) (Vieira *et al.*, 2008).

Phrynops geoffroanus (Schweigger, 1812), mouth

and esophagus, BRAZIL (São Paulo State) (Silva, 2014).

Phrynosops Geoffroyanus (Schweigger, 1812), buccal and pharyngeal cavities, BRAZIL (Sergipe State) (Santana *et al.*, 2019).

***Polystomoides fuquesi* Mañé-Garzón & Gil, 1962**

Phrynosops hilarii (Duméril & Bibron, 1835), oral cavity, URUGUAY (Artigas Department) (Mañé-Garzón & Gil, 1962a).

***Polystomoides magdalenensis* Lenis & García-Prieto, 2009**

Trachemys callirostris (Gray, 1856), oral cavity, COLOMBIA (Bolívar Department) (Lenis & García-Prieto, 2009).

***Polystomoides rohdei* Mañé-Garzón & Holcman-Spector, 1968**

Trachemys dorbigni (Duméril & Bibron, 1835), oral cavity, URUGUAY (Florida, Soriano, and Rivera Departments) (Mañé-Garzón & Holcman-Spector, 1968b).

Trachemys dorbigni (Duméril & Bibron, 1835), oral cavity, BRAZIL (Rio Grande do Sul State), (Mascarenhas, 2014).

***Polystomoides uruguayensis* Mañé-Garzón & Gil, 1961**

Phrynosops hilarii (Duméril & Bibron, 1835), oral cavity, URUGUAY (Artigas Department) (Mañé-Garzón & Gil, 1961d).

***Polystomoides* sp.**

Acanthochelys spixii (Duméril & Bibron, 1835), oral cavity, BRAZIL (Rio Grande do Sul State) (Chaviel *et al.*, 2020).

***Polystomoides* sp.**

Phrynosops Geoffroyanus (Schweigger, 1812), urinary bladder, BRAZIL (São Paulo State) (Silva, 2014).

***Polystomoides* sp.**

Phrynosops hilarii (Duméril & Bibron, 1835), oral cavity, BRAZIL (Rio Grande do Sul State) (present study, CHLAPASIL 902).

***Neopolystoma* Price, 1939**

***Neopolystoma* sp.**

Trachemys dorbigni (Duméril & Bibron, 1835), urinary bladder, BRAZIL (Rio Grande do Sul

State) (Mascarenhas, 2014).

***Neopolystoma* sp.**

Mesoclemmys vanderhaegei (Bour, 1973), unspecified site of infection, BRAZIL (Mato Grosso State) (Ávila *et al.*, 2010).

Superfamily Iagotrematoidea Mañé-Garzón & Gil, 1962

Family Iagotrematidae Mañé-Garzón & Gil, 1962

***Iagotrema* Mañé-Garzón & Gil, 1962**

***Iagotrema uruguayensis* Mañé-Garzón & Gil, 1962**

Hydromedusa tectifera Cope, 1870, urinary bladder, URUGUAY (Tacuarembó Department) (Mañé-Garzón & Gil, 1962b).

Infraclass Rhabdocoela Ehrenberg, 1831

Order Dalytyphloplanida Williems *et al.*, 2006

Infraorder Temnocephalida Blanchard, 1849

Superfamily Temnocephaloidea Baer, 1953

Family Temnocephalidae Monticelli, 1899

***Temnocephala* Blanchard, 1849**

***Temnocephala brevicornis* Monticelli 1889**

Acanthochelys radiolata (Mikan, 1820), BRAZIL (unspecified locality) (Monticelli 1889 cited by Martínez-Aquino *et al.*, 2014).

Acanthochelys spixii (Duméril & Bibron, 1835), skin of the neck, axillary, inguinal region, BRAZIL (Rio Grande do Sul State) (Yuki *et al.*, 1993).

Hydromedusa tectifera Cope, 1870, plastron and the skin of the axillary, inguinal and anal regions, BRAZIL (São Paulo State) (Pereira & Cuocolo, 1940).

Hydromedusa tectifera Cope, 1870, URUGUAY (Tacuarembó Department) (Dioni, 1967 cited by Martínez-Aquino *et al.*, 2014).

Hydromedusa tectifera Cope, 1870, URUGUAY (Montevideo) (Cordero, 1946).

Hydromedusa tectifera Cope, 1870, surface, ARGENTINA (Buenos Aires Province) (Brusa & Damborenea, 2000; Martínez-Aquino *et al.*, 2014).

Hydromedusa maximiliani (Mikan, 1820), plastron and the skin of the axillary, inguinal and anal regions, BRAZIL (Rio de Janeiro) (Pereira & Cuocolo, 1940).

Hydromedusa maximiliani (Mikan, 1820), plastron and the skin of the axillary, inguinal and anal regions, BRAZIL (Minas Gerais State) (Pereira & Cuocolo, 1940).

Hydromedusa maximiliani (Mikan, 1820),

epidermis of the neck, axillary, inguinal and anal region and plastron, BRAZIL (Minas Gerais State) (Novelli *et al.*, 2009).

Mesoclemmys gibba (Schweigger, 1812), BRAZIL (Monticelli, 1899 cited by Pereira & Cuocolo, 1940).

Phrynops hilarii (Duméril & Bibron, 1835), ARGENTINA (Buenos Aires Province) (Martínez-Aquino *et al.*, 2014).

Trachemys dorbigni (Duméril & Bibron, 1835), skin of the neck, axillary, inguinal and anal areas, and plastron, BRAZIL (Rio Grande do Sul State) (Yuki *et al.*, 1993).

***Temnocephala cuocoloi* Volonterio, 2010**

Hydromedusa tectifera Cope, 1870, surface of the plastron, URUGUAY (Canelones Department) (Volonterio, 2010).

***Temnocephala pereirai* Volonterio, 2010**

Hydromedusa tectifera Cope, 1870, surface of the plastron, URUGUAY (Canelones Department) (Volonterio, 2010).

Trachemys dorbigni (Duméril & Bibron, 1835), skin of the neck, axillary, inguinal and perianal areas, and in the surface of plastron, BRAZIL (Rio Grande do Sul State) (Seixas *et al.*, 2014; Mascarenhas *et al.*, 2018).

***Temnocephala* sp.**

Trachemys dorbigni (Duméril & Bibron, 1835), skin of the neck, axillary, inguinal and perianal areas, and plastron, BRAZIL (Rio Grande do Sul State) (Mascarenhas *et al.*, 2018).

***Temnocephala* sp.**

Hydromedusa tectifera Cope, 1870, body, limbs and hull, BRAZIL (Rio Grande do Sul State) (Soares *et al.*, 2007).

***Temnocephala* sp.**

Hydromedusa tectifera Cope, 1870, dorsal surface of the plastron, ventral surface of the carapace and bridges, epidermis adjacent to the ventral surface of the carapace and epidermis of the bases of neck and limbs, BRAZIL (Rio Grande do Sul State) (Huckembeck & Quintela, 2013).

***Temnocephala* sp.**

Hydromedusa tectifera Cope, 1870, surface of the plastron, ventral surface of the carapace and bridges, epidermis adjacent to the ventral surface

of the carapace and epidermis of the bases of neck and limbs, BRAZIL (Rio Grande do Sul State) (present study, CHLAPASIL 897-901).

Phylum Acanthocephala Rudolphi, 1808

Class Palaeacanthocephala Meyer, 1931

Order Polymorphida Petrochenko, 1956

Family Polymorphidae Meyer, 1931

Polymorphidae gen. sp. (immature)

Acanthochelys spixii (Duméril & Bibron, 1835), small intestine, BRAZIL (Rio Grande do Sul State) (present study, CHLAPASIL 888).

HOST-HELMINTH LIST

Cryptodira

Kinosternoidea

Kinosternidae

Kinosternon integrum (IUCN: Least concern)

Serpinema maghati

Kinosternon leucostomum

Atractis caballeroi

Kinosternon scorpioides

Camallanus kachugae

Nematophila grandis

Serpinema maghati

Serpinema monospiculatus

Spiroxys figueiredoi

Telorchis diaphanus

Telorchis rapidulus

Testudinoidea

Emydidae

Emys orbicularis (IUCN: near threatened)

Telorchis parvus

Trachemys callirostris

Heronimus mollis

Nematophila argentinum

Polystomoides magdalenensis

Telorchis corti

Trachemys dorbigni

Camallanus emydidius

Camallanus sp.

Cheloniodiplostomum sp.

Diocetophyme renale (larvae)

Eustrongylides sp. (larvae)

Falcaustra affinis

Neopolystoma sp.

Polystomoides rohdei

*Spiroxys contortus**Spiroxys* sp.*Telorchis achavali**Telorchis corti**Telorchis dubius**Telorchis* sp.*Temnocephala brevicornis**Temnocephala pereirai**Temnocephala* sp.**Geoemydidae*****Rhinoclemmys annulata*** (IUCN: near threatened)*Atractis caballeroi**Falcaustra tikasinghi****Rhinoclemmys diademata****Atractis impure****Rhinoclemmys melanosterna****Falcaustra tikasinghi****Rhinoclemmys nasuta*** (IUCN: near threatened)*Falcaustra tikasinghi**Halltrema heteroxenus**Hedruris* sp.*Nematophila grandis**Octangioides tlacotalpensis**Pseudocleptodiscus margaritae****Rhinoclemmys punctularia****Falcaustra tikasinghi**Nematophila grandis**Serpinema cayennensis***Testudinidae*****Chelonoidis carbonarius****Atractis thapari**Atractis* sp.*Chapiniella variabilis**Thelandros* sp.***Chelonoidis chilensis*** (IUCN: Vulnerable)*Falcaustra* sp.*Labiduris* sp.***Chelonoidis denticulatus*** (IUCN: Vulnerable)*Angusticaecum brevispiculum**Atractis impure**Atractis thapari**Chapiniella variabilis**Halltrema avitellina**Helicotrema spirale**Klossinemella travassosi**Labiduris gulosa**Labiduris irineuta**Labiduris zschokkei**Ophiotaenia lopesi**Sauricola sauricola****Chelonoidis porteri*** (IUCN: Critically endangered)*Atractis marquezii**Atractis* sp.*Labiduris* sp.***Kinixys erosa*** (IUCN: Data deficient)*Nematophila grandis****Testudo* sp.***Cheloniodiplostomum testudinis***Pleurodira****Chelidae*****Acanthochelys radiolata*** (IUCN: Near threatened)*Temnocephala brevicornis****Acanthochelys spixii*** (IUCN: Near threatened)*Caimanicola brauni**Camallanus* sp.*Cheloniodiplostomum* sp.*Contraecaecum* sp. (larvae)*Dioctophyme renale* (larvae)

Pharyngodonidae gen. sp.

Physaloptera sp. (larvae)

Polymorphidae gen. sp. (immature)

Polystomoides sp.*Spiroxys contortus**Telorchis platensis**Temnocephala brevicornis****Chelus fimbriata****Acanthostomum scyphocephalus**Atamatam amazoniensis**Nematophila grandis**Paratamatam iquitosiensis****Mesoclemmys gibba****Nematophila grandis**Temnocephala brevicornis****Mesoclemmys nasuta****Atractis dactyluris**Labiduris gulosa**Nematophila grandis*

Serpinema monospiculatus
Mesoclemmys turbeculata
Physaloptera retusa
Polystomoides brasiliensis
Serpinema monospiculatus
Spiroxys figueiredoi

Mesoclemmys vanderhaegei (IUCN: Near threatened)
Neopolystoma sp.
Spiroxys sp.

Phrynops geoffroanus
Brevimulticaecum sp. (larvae)
Camallanus sp.
Cheloniodiplostomum brevis
Cheloniodiplostomum testudinis
Cheloniodiplostomum sp.
Gorgoderina sp.
Nematophila grandis
Physaloptera sp. (larvae)
Physaloptera retusa
Polystomoides brasiliensis
Polystomoides sp.
Prionosomoides scalaris
Serpinema monospiculatus
Spiroxys figueiredoi
Telorchis birabeni

Phrynops hilarii
Caimanicola brauni
Camallanus sp.
Cheloniodiplostomum argentinensis
Cheloniodiplostomum testudinis
Cheloniodiplostomum sp.
Diectophyme renale (larvae)
Hedruris dratini
Hedruris orestiae
Nematophila grandis
Polystomoides fuquesi
Polystomoides uruguayensis
Polystomoides sp.
Prionosomoides phrynopsis
Prionosomoides scalaris
Prionosomoides sp.
Spiroxys contortus
Spiroxys sp.
Telorchis birabeni
Telorchis productus
Temnocephala brevicornis
Timoniella ostrowoski

***Phrynops* sp.**
Nematophila argentinum

Hydromedusa maximiliani (IUCN: Vulnerable)
Polystomoides brasiliensis
Temnocephala brevicornis

Hydromedusa tectifera
Camallanus emydidius
Cheloniodiplostomum testudinis
Cheloniodiplostomum sp.
Diectophyme renale (larvae)
Gnathostoma sp. (larvae)
Hedruris dratini
Hedruris orestiae
Iagotrema uruguayensis
Nematophila grandis
Ophiotaenia cohospes
Ophiotaenia sp.
Pseudotelorchis devincenzii
Spirocamallanus sp.
Spiroxys contortus
Telorchis platensis
Telorchis sp.
Temnocephala brevicornis
Temnocephala cuocoloi
Temnocephala pereirai
Temnocephala sp.

Hydraspis schopfii
Nematophila grandis

Podocnemididae
Peltocephalus dumerilianus (IUCN: Vulnerable)
Ancyracanthus pinnatifidus
Atractis dactyluris
Atractis trematophila
Helicotrema spirale
Klossinemella conciliatus
Klossinemella sp.
Nematophila grandis
Paratractis hystrix
Serpinema microcephalus
Telorchis hagmanni

Podocnemis erythrocephala (IUCN: Vulnerable)
Nematophila grandis
Paratractis hystrix

Podocnemis expansa (IUCN: Lower Risk/conservation dependent)
Ancyracanthus pinnatifidus

Atractis cruciate
Atractis dactyluris
Atractis sp.
Braunotrema pulvinatum
Halltrema avitellina
Klossinemella conciliatus
Nematophila grandis
Oriximinatrema noronhae
Paratractis hystrix
Podocnematractis colombiaensis
Podocnematractis ortleppi
Podocnemitrema papillosum
Rhytidodes gelatinosus
Serpinema amazonicus
Serpinema microcephalus
Telorchis bifurcus
Telorchis hagmanni

Podocnemis lewyana (IUCN: Critically Endangered)

Nematophila argentinum
Nematophila venezuelensis
Neodeuterobaris pritchardae
Pseudonematophila ovalis
Telorchis hagmanni

Podocnemis unifilis (IUCN: Vulnerable)

Ancyracanthus pinnatifidus
Buckleyatractis marinkelli
Halltrema avitellina
Halltrema heteroxenus
Klossinemella conciliatus
Loefgrenia loefgrenia
Nematophila grandis
Nematophila sp.
Orientatractis leiperi
Paraorientatractis semiannulata
Paratractis hystrix
Pneumoatractis podocnemis
Podocnematractis ortleppi
Podocnemitrema papillosum
Serpinema amazonicus
Telorchis aculeatus
Telorchis hagmanni

Podocnemis vogli

Nematophila grandis
Orientatractis leiperi
Paratractis hystrix
Podocnematractis colombiaensis
Podocnematractis ortleppi

***Podocnemis* sp.**

Halltrema avitellina
Halltrema heteroxenus
Nematophila grandis
Nematophila venezuelensis
Pseudonematophila ovalis

Freshwater turtle

Telorchis pleroticus

Amazon river turtle

Atractis trematophila

DISCUSSION

Cohen *et al.* (2013) carried out a list of Monogeneoidea associated with Testudines from South America in which they cited eight records. This checklist added nine records of Polystomatidae. Fernandes & Kohn (2014) introduced a checklist of Trematoda, in which they cited 34 *taxa* registered in the region. This checklist added 15 *taxa* to this group of parasites. Martínez-Aquino *et al.* (2014) gathered the records of Temnocephalida in the Neotropical region and cited four *taxa* associated with freshwater turtles from South America. This checklist added three *taxa* associated with these vertebrates and included the record of *Temnocephala pereirai* in *Trachemys dorbigni* in Brazil (Seixas *et al.*, 2014; Mascarenhas *et al.*, 2018). In addition, this checklist has gathered the records of Nematoda, Cestoda and Acanthocephala parasites of Testudines from South America. Thus, it should be highlighted that these vertebrates host a little-known rich fauna of helminths, that many Testudines have been poorly studied and that several studies have only been carried out with the examination of their digestive tract (e.g. Sanchez *et al.*, 2006; Tantaleán *et al.*, 2011; Tantaleán & Forlong, 2013; Viana *et al.*, 2016). Besides the stomach and intestines (main reported sites of infection), parasitic helminths can be found in blood vessels (Bullard *et al.*, 2019), lungs (Burseley *et al.*, 2009; Lenis & Vélez, 2011), the urinary bladder (Mañé-Garzón & Gil, 1962; Mascarenhas, 2014) and in other sites of infection that have not been reported yet.

Concerning the conservation status of continental Testudines from South America, many species are

threatened. According to Rhodin *et al.* (2017), Testudines are one of the most threatened major groups of vertebrates, in general more than birds, mammals, cartilaginous or bony fishes and amphibians. In this scenario, several helminths associated with these hosts can either be potentially impacted or even extinct without at least being described or recorded. Less than half of native South American species cited in the IUCN list have had helminthological records. *Peltocephalus dumerilianus* (VU), *Podocnemis unifilis* (VU) and *Chelonoides denticulatus* (VU) are the most studied ones, while *Chelonoides chilensis* (VU), *Podocnemis erythrocephala* (VU), *Podocnemis lewyana* (CR) and *Chelonoides porteri* (CR) are the least studied ones; two records of helminths in *P. erythrocephala* date from the 19th century (Diesing, 1850 cited by Fernandes & Kohn, 2014; Diesing, 1851). Studies of *P. lewyana*, *C. chilensis*, and *C. porteri* are more recent (Brooks, 1976; Bursey & Flanagan, 2002; Lenis & Vélez, 2011; Fournié *et al.*, 2015; Castillo *et al.*, 2020). As for ectosymbionts, it should be highlighted that *Temnocephala* comprises freshwater species endemic to the Neotropical region that have specificity regarding the host group and/or species (Martínez-Aquino *et al.*, 2014). Only seven out of 71 continental Testudines *taxa* from South America were reported as hosts of *Temnocephala*; three species were listed as near threatened (NT) by the IUCN. Therefore, conservation actions related to Testudines can contribute to the conservation of several other organisms that depend on these vertebrates.

Parasites are regulators of host populations and powerful agents that maintain the stability of ecosystems. Many species of helminths, for example, have complex life cycles which involve one or more intermediate hosts and must be ingested by the final host to ensure transmission and survival of the parasite organism. Thus, occurrence of a heteroxenic helminth may reflect prey-predator interactions and show the position of hosts in the trophic chain (Brooks & Hoberg, 2001; Marcogliese, 2004). Since parasites can provide a lot of information about host organisms and their habitats, they contribute to the knowledge of host biology, environmental stress, trophic chains and biodiversity (Poulin, 1999; Marcogliese, 2004; Horwitz & Wilcox, 2005). Anjos (2011) highlighted the importance of basic research and

inventories of wildlife associated helminths, particularly in biomes and host species that have not been sampled because the missing information is even greater than the current state of knowledge, as observed in the present review. In this context, helminthological studies of Testudines generate information that can be used in studies that aim at the conservation of the host species and, consequently, of their associated organisms, as well as the sites that sustain these invaluable relations.

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