



## Digenean parasites of six species of birds from Formosa Province, Argentina

### Digéneos parásitos de seis especies de aves de la provincia de Formosa, Argentina

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**Abstract.** The aim of this paper is to increase the knowledge of the diversity of digenean parasites from birds collected in Formosa Province, Argentina. The helminthological survey of 15 specimens of 6 bird species revealed the presence of 5 digenean species: *Clinostomatopsis sorbens* (Braun, 1899) and *Clinostomum marginatum* (Rudolphi, 1819) (Clinostomidae) from the esophagus of *Tigrisoma lineatum* (Boddaert); *Glaphyrostomum propinquum* Braun, 1901 (Brachylaimidae) from the cloaca of *Guira guira* (Gmelin); *Stomylotrema vicarium* Braun, 1901 (Stomylotrematidae) from the cloaca of *Busarellus nigricollis* (Latham) and *Buteogallus meridionalis* (Latham); and *Athesmia heterolecithodes* (Braun, 1899) (Dicrocoeliidae) from the bile canaliculi of *G. guira*, *Milvago chimachima* (Vieillot) and *Rostrhamus sociabilis* (Vieillot). The present study adds new morphometric data on 2 species of digeneans (*C. sorbens* and *G. propinquum*) and new host records for *C. sorbens*, *G. propinquum*, *A. heterolecithodes* and *S. vicarium*. The genera *Clinostomatopsis* Dollfus, 1932 and *Glaphyrostomum* Braun, 1901 are reported for the first time in Argentina.

**Key words:** *Clinostomatopsis sorbens*, *Clinostomum marginatum*, *Glaphyrostomum propinquum*, *Athesmia heterolecithodes*, *Stomylotrema vicarium*, Argentina.

**Resumen.** El propósito de este trabajo es incrementar el conocimiento sobre la diversidad de digéneos parásitos de aves recolectadas en la provincia de Formosa, Argentina. El estudio helmintológico de 15 ejemplares de 6 especies de aves reveló la presencia de 5 especies de digéneos: *Clinostomatopsis sorbens* (Braun, 1899) y *Clinostomum marginatum* (Rudolphi, 1819) (Clinostomidae) halladas en el esófago de *Tigrisoma lineatum* (Boddaert); *Glaphyrostomum propinquum* Braun, 1901 (Brachylaimidae) recolectada de la cloaca de *Guira guira* (Gmelin); *Stomylotrema vicarium* Braun, 1901 (Stomylotrematidae) encontrada en la cloaca de *Busarellus nigricollis* (Latham) y *Buteogallus meridionalis* (Latham); *Athesmia heterolecithodes* (Braun, 1899) (Dicrocoeliidae) hallada en los canalículos biliares de *G. guira*, *Milvago chimachima* (Vieillot) y *Rostrhamus sociabilis* (Vieillot). El presente estudio aporta nuevos datos morfológicos sobre 2 especies de digéneos (*C. sorbens* and *G. propinquum*) y nuevos registros de hospedadores para *C. sorbens*, *G. propinquum*, *A. heterolecithodes* and *S. vicarium*. Los géneros *Clinostomatopsis* Dollfus, 1932 y *Glaphyrostomum* Braun, 1901 son reportados por primera vez en Argentina.

**Palabras clave:** *Clinostomatopsis sorbens*, *Clinostomum marginatum*, *Glaphyrostomum propinquum*, *Athesmia heterolecithodes*, *Stomylotrema vicarium*, Argentina.

### Introduction

Formosa Province is included in the humid Chaco ecoregion of Argentina where almost 300 bird species have been reported, with a poorly known digenean fauna. At present, available information regards adults of strigeids from *Buteo magnirostris* (Gmelin), diplostomids from *Ardea alba* L., *Caracara plancus* (Miller) and *Phalacrocorax brasilianus* (Gmelin) (Lunaschi and Drago, 2005, 2006a, 2006b), and some metacercariae from fishes whose definitive hosts are birds (Szidat, 1969). During the course of this study, we have studied the digeneans found

parasitizing the rufescent tiger-heron *Tigrisoma lineatum* (Boddaert), the guira cuckoo *Guira guira* (Gmelin), the black-collared hawk *Busarellus nigricollis* (Latham), the yellow-headed caracara, *Milvago chimachima* (Vieillot), the snail kite *Rostrhamus sociabilis* (Vieillot), and the savanna hawk *Buteogallus meridionalis* (Latham). In Argentina, none of these species has previously been reported as digenean hosts (Lunaschi et al., 2007). Worldwide, the digenean fauna of these birds is poorly known or unknown (Table 1).

The aim of this paper is to report new taxonomic data for 5 digenean species found parasitizing these bird species from Formosa Province, Argentina, and to present new host and geographical records.

**Table 1.** Previous records of digenean species from host examined in the present study\*

<i>Bird</i>	<i>Parasite</i>	<i>Infection Site</i>	<i>Locality</i>	<i>References</i>
<i>B. nigricollis</i>	<i>Microparyphium asotum</i> Dietz, 1909	intestine	Brazil	Travassos et al., 1969
	<i>Posthodiplostomum nanum</i> Dubois, 1937	intestine	Paraguay	Dubois, 1985
	<i>Tylodelphys</i> sp.	intestine	Colombia	Dubois, 1978
<i>G. guira</i>	<i>Athesmia heterolecithodes</i> (Braun, 1899)	bile ducts	Brazil	Travassos et al., 1969
	<i>Echinostoma uncatum</i> Dietz, 1909	intestine	Brazil, Venezuela	Travassos et al., 1969 Thatcher, 1993
	<i>Eumegacetes medioximus</i> Braun, 1901	cloaca	Brazil	Travassos et al., 1969
	<i>Tanaisia magnicolica</i> Freitas, 1951	kidneys	Brazil	Teixeira de Freitas, 1951 Travassos et al., 1969
<i>M. chimachima</i>	<i>A. heterolecithodes</i>	bile ducts	Brazil	Travassos et al., 1969
	<i>Lubens lubens</i> (Braun, 1901)	gall bladder	Brazil	Travassos et al., 1969
<i>R. sociabilis</i>	<i>Bothrigaster variolaris</i> (Fuhrmann, 1904)	Intestine	Brazil	Travassos et al., 1969
	<i>Echinostoma armatum</i> Fuhrmann, 1904	Intestine	South America	Thatcher, 1993
	<i>Megalophallus deblocki</i> Kostadinova, Vaucher and Gibson, 2006	Intestine	Paraguay	Kostadinova et al., 2006
<i>T. lineatum</i>	<i>Apharyngostrigea cornu</i> (Zeder, 1800)	Intestine	not reported	Dubois, 1970
	<i>Amphimerus interruptus</i> (Braun, 1901)	Pancreas, gall bladder	Brazil	Arruda et al., 2001
	<i>Australapatemon bdello cystis</i> (Lutz, 1921)	Intestine	not reported	Dubois, 1970
	<i>Clinostomum marginatum</i> (Rudolphi, 1819)	Buccal cavity, proventriculus	Brazil	Arruda et al., 2001
	<i>Clinostomum detruncatum</i> Braun, 1899	Esophagus	Brazil	Travassos et al., 1969
	<i>Episthmium oscari</i> Travassos, 1922		Brazil	Travassos et al., 1969
	<i>Ithyoclinostomum dimorphum</i> (Diesing, 1850)	Esophagus	Brazil	Arruda et al., 2001
	<i>Prohemistomum odhneri</i> (Travassos, 1924)	Intestine	not reported	Dubois, 1970

\* Previous reports for *Busarellus meridionalis* as host of digenean species do not have been made.

## Material and methods

Fifteen birds (*T. lineatum* n=1; *G. guira* n=3; *M. chimachima* n=2; *R. sociabilis* n=3; *B. nigricollis* n=2; *B. meridionalis* n=4) were shot from October 2004 to October 2007 in Pirané, Formosa Province, Argentina. Birds were dissected and examined for helminths in the field or frozen and examined in the laboratory. Digeneans were fixed in formalin, unflattened, stained with hydrochloric carmine and mounted between 2 microscope coverslips in Canada balsam. Measurements are given in micrometers ( $\mu\text{m}$ ), unless otherwise stated, with the range followed by mean in parentheses. Drawings were made with the aid of a drawing tube. Voucher specimens were deposited in the Helminthological Collection of the Museo de La Plata (MLP), Argentina. The term *forebody* refers to the distance between the anterior extremity and the anterior margin of ventral sucker; the term *hindbody* refers to the distance between the posterior margin of ventral sucker and the posterior extremity. The terms esophagus and esophageal

bulb utilized in *Clinostomum marginatum* (Rudolphi, 1819) Braun, 1899 were used according to Matthews and Cribb (1998).

## Redescriptions

*Clinostomatopsis sorbens* (Braun, 1899) Dollfus, 1932 (Fig 1-2)

Redescription based on 1 specimen. Body stout, linguiform, slightly convex dorsally, 9.1 mm long, 2.6 mm wide; tegument aspinous. Forebody 1.9 mm long, occupying 21% of total body length. Hindbody 5.6 mm long. Oral sucker subterminal, small, surrounded by incomplete collar-like fold, 384 long, 540 wide. Ventral sucker well developed, strongly muscular, located about 1/3 distance down body from anterior end, 1.5 mm long, 1.4 mm wide. Sucker width ratio 1:2.5. Ratio of body length to ventral sucker length 1:6.1. Prepharynx short, 192 long; pharynx well developed, smaller than oral

sucker, 269 long, 250 wide; esophagus absent; caeca simple, long, reaching to near posterior end, and connected to Y-shaped excretory vesicle; excretory pore dorso-subterminal. Ratio of oral sucker width to pharynx width 1:2.2. Testes tandem, large, deeply lobed, H-shaped, near posterior extremity; anterior testis 1.1 mm long, 1.2 mm wide; posterior testis 1.4 mm long, 1.3 mm wide. Cirrus sac large, intertesticular, containing voluminous seminal vesicle, 624 long, 461 wide; pars prostatic not seen. Genital pore median, intertesticular in posterior 1/3 of body. Ovary oval, intercecal, intertesticular, submedian and dextral, 336 long, 336 wide. Ratio of testes average width to ovary width 1:3.7. Ratio of cirrus sac width to ovary width 1:1.4. Laurer's canal short, opening immediately posterior to ovary on dorsal surface. Ootype surrounded by Mehlis' gland lateral sinistral to ovary, immediately posterior to cirrus sac. Vitellaria follicular distributed in intercecal, cecal and extracecal fields, commencing midway between intestinal bifurcation and anterior margin of ventral sucker and confluent below the ventral sucker and posterior end of body. Uterine duct thin, extends from intertesticular space, opens into uterine sac. Uterine seminal receptacle present. Eggs operculate, 115-125 x 67. Ratio of body length to egg length 1:73-79.

#### Taxonomic summary

*Host:* *Tigrisoma lineatum* (Boddaert) (Ardeidae).

*Locality:* Bellaco stream (26°14'S; 58°07'W), Pirané, Formosa Province, Argentina.

*Site of infection:* esophagus.

*Specimens deposited:* MLP 5573.

#### Remarks

Species of the genus *Clinostomatopsis* Dollfus, 1932 are known to parasitize the esophagus of neotropical birds, and are characterized by the presence of a cirrus sac and a genital pore in the intertesticular region. At present, 2 species are recognized: *C. sorbens* and *C. intermedialis* (Lamont, 1920). *Clinostomatopsis intermedialis* was described parasitizing the cormorants *Phalacrocorax brasilianus brasilianus* (Gmelin) (= *Phalacrocorax vigua*) and *Phalacrocorax penicillatus* (Brandt) from Venezuela and Mexico (Lamont, 1920; Bravo-Hollis, 1947). This species differs from the specimen collected from *T. lineatum* in the anterior extent of the vitelline follicles (beginning at equatorial region of the ventral sucker or more posteriorly), in the size of the prepharynx (142-160) and pharynx (355 x 273-309), and in the shape of testes (anterior testis trilobed or ovoid, posterior testis trilobed) (Lamont, 1920; Bravo-Hollis, 1947).

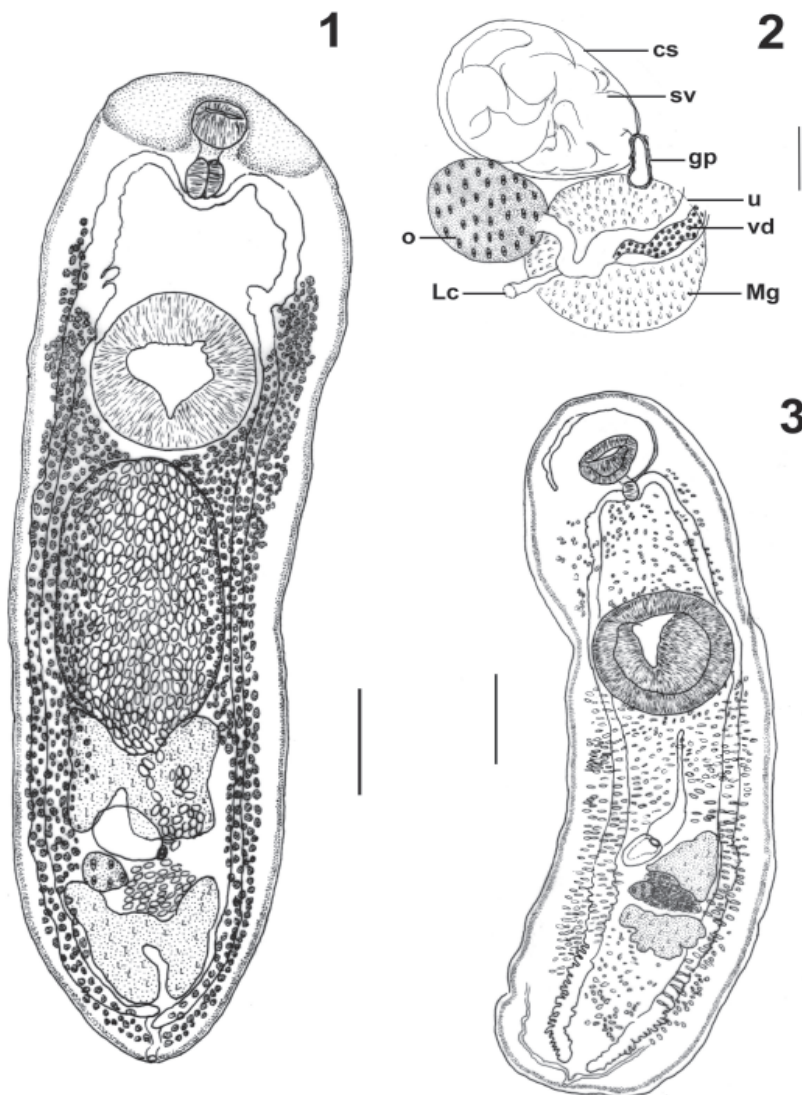
*Clinostomatopsis sorbens* was originally described by

Diesing (1850) as *Distomum dimorphum* Diesing based on specimens from the wood stork, *Mycteria americana* L. (= *Ciconia americana*) (Ciconiidae) from Brazil. Braun (1899) transferred these specimens to the genus *Clinostomum* Leidy, 1856 as *Clinostomum sorbens* without adding any description, and later Dollfus (1932) created the genus *Clinostomatopsis* to include the specimens described by Diesing (1850) with the genital pore posterior to the anterior testis. Braun (1900) re-described this species with few metric characteristics. Travassos (1922, 1928), Viana (1924) and Travassos et al. (1969), reported it for Brazil in *Ardea cocoi* L. (Ardeidae) and *Jabiru mycteria* (Lichtenstein) (Ciconiidae) providing no description. Since then, this species has not been mentioned from other hosts and/or localities. The morphology and the metric characters of the specimen studied in this paper correspond to the re-description by Braun (1900).

In this paper, we present new morphological and morphometrical data (size of prepharynx, pharynx, testes, ovary and cirrus-sac) of this species. The presence of *C. sorbens* in *T. lineatum* represents a new host record and the first report of a species of *Clinostomatopsis* in Argentinean birds.

*Clinostomum marginatum* (Rudolphi, 1819) Braun, 1899 (Fig. 3)

Redescription based on 6 immature specimens. Body stout, linguiform, slightly convex dorsally, 2.8-5.8 (4.7) mm long, 0.9-1.4 (1.1) mm wide; tegument aspinous. Forebody, 0.8-1.5 (1.1) mm long occupying 22-28% (25%) of total body length. Hindbody 1.5-3.5 (2.8) mm long. Oral sucker small, surrounded by collar-like fold, 197-278 (236) long, 240-336 (299) wide. Ventral sucker very large, strongly muscular, located in second quarter of body, 605-720 (677) long, 614-720 (667) wide. Suckers width ratio 1:2.1-2.6 (1:2.3). Ratio of body length to oral sucker length 1:13-24 (1:19). Ratio of body length to ventral sucker length 1:4.7-8.7 (1:6.7). Pharynx absent, esophagus 161-225 (193) long with esophageal bulb poorly developed, 82-161 (113) long, 82-127 (98) wide; caeca long with small lateral diverticula in last quarter of body. Ratio of oral sucker length to esophageal bulb length 1:1.5-2.9 (1:2.4). Testes tandem at posterior half of body; anterior testis triangular in posterior end of middle third of body, 336-475 (384) long 350-523 (442) wide; posterior testis feebly lobed in last quarter of body, 288-480 (360) long x 432-480 (464) wide. Cirrus sac oval, small, sub-median, located in middle posterior of second third of body, between right caeca and anterior testis, 298-414 (362) long, 136-168 (151) wide; voluminous seminal vesicle present; pars prostatica not seen. Genital pore median, lateral to anterior testis. Ovary oval, small,



**Figures 1-3** *Clinostomatopsis sorbens* (Braun, 1899) from *Tigrisoma lineatum*. 1, entire worm, ventral view. Scale-bar: 1 mm. 2, enlarged ventral view of ovary complex, cirrus pouch and genital pore. Scale-bar: 200  $\mu$ m. 3, *Clinostomum marginatum* (Rudolphi, 1819) from *Tigrisoma lineatum*, entire worm, ventral view. Scale-bar: 500  $\mu$ m. Abbreviations: cs- cirrus sac, gp - genital pore, Lc- Laurer's canal, Mg- Mehlis' gland, o- ovary, sv- seminal vesicle, u- uterus, vd- vitelline duct.

*Specimens deposited:* MLP 5574.

#### Remarks

In the Neotropical region, 5 species of *Clinostomum* have been reported parasitizing ciconiform and pelecaniform birds: *C. detruncatum* Braun, 1899 in ardeids and ciconids from Brazil, Venezuela and Argentina; *C. hehuans* Braun, 1899 in ardeids from Brazil, Venezuela, Cuba and Mexico; *C. complanatum* (Rud., 1819) Braun, 1899 in ardeids and phalacrocoracids from Cuba, Mexico, Argentina and Brazil; *C. attenuatum* Cort, 1913 in ardeids from Cuba, and *C. marginatum* in ardeid, ciconid, phalacrocoracid and anhingid birds from Brazil (Travassos, 1922; Bravo Hollis, 1947; Pérez Viguera, 1955; Caballero and

Diaz-Ungria, 1958; Travassos et al., 1969; Boero and Led, 1971; Ramos-Ramos, 1995; Lamothe-Argumedo et al., 1997; Sutton and Damborenea, 2000; Arruda et al., 2001; Dias et al. 2003). Ukoli (1966) considers *C. complanatum* and *C. marginatum* synonymous, however Dzikowski et al., (2004), consider them as valid species, based on molecular evidence.

The morphological and metrical characters of the specimens of *C. marginatum* from *Ardea* sp. described by Braun (1900) are similar to those found in our material, except for the size of the body (7 mm); specimens from *A. cocoi* described by the same author differs from the Argentinean material only in body and ventral sucker length (8 mm and 1.07 mm, respectively).

In Argentina, the metacercariae of this species (cited

interstitial and median, 134-173 (153) long, 106-144 (122) wide. Ratio of cirrus sac length to ovary length 1:1.8-3.0 (1:2.5). Ratio of testes average width to ovary width 1:3.5-4.5 (1:3.8). Mehlis' gland well developed, lateral to ovary; Laurer's canal short, opening dorsally at ovarian region. Vitellarium not developed. Uterine sac anterior to testes. Excretory vesicle V-shaped, connected to intestinal caeca; excretory pore terminal.

#### Taxonomic summary

*Host:* *Tigrisoma lineatum* (Boddaert) (Ardeidae).

*Locality:* Bellaco stream (26°14'S; 58°07'W), Pirané, Formosa Province, Argentina.

*Site of infection:* esophagus.



as *Clinostomulum marginatum*) were found by Szidat (1969) encapsulated in the body cavity of *Neofundulus paraguayensis* (Eigenmann and Kennedy) (Pisces, Rivulidae) from Formosa Province. The morphological and metrical characters of these metacercariae are coincident with the immature specimens recovered from *T. lineatum*. *Clinostomulum marginatum* and *C. sorbens* were found simultaneously in the same host. The presence of *C. marginatum* in *T. lineatum* represents the first report of this parasite in Argentinean birds.

*Glaphyrostomum propinquum* Braun, 1901 (Fig. 4)

Redescription based on 3 specimens. Body oval, with maximum width at equatorial level, 1.1-1.8 (1.3) mm long, 0.586-0.672 (0.631) mm wide; tegument smooth. Forebody 497-745 (583) long, occupying 41-46% (44%) of total body length. Hindbody 299-686 (435) long. Oral sucker round, subterminal, 341-422 (376) long, 350-432 (382) wide. Ventral sucker muscular, nearly the same size as the oral sucker, located in middle of body, 346-432 (375) long, 365-413 (384) wide. Suckers width ratio 1:0.96-1.05 (1:0.99). Ratio of body length to ventral sucker length 1:3.1-4.2 (1:3.6). Prepharynx absent, pharynx well developed, 106-149 (122) long, 133-170 (145) wide, esophagus absent, intestinal caeca straight, reaching to posterior end. Ratio of oral sucker length to pharynx length 1:2.8-3.4 (1:3.1). Testes slightly diagonal, contiguous, smooth, intercecal, located in posterior end of body; anterior testis 121-150 (136) long, 175-184 (180) wide; posterior testis 112-159 (136) long, 161-172 (167) wide. Cirrus-sac small, oval, overlapping posterior testis, 298-414 (362) long, 136-168 (151) wide. Genital pore median, at level of posterior testis. Ovary oval, smaller than testes, median, intercecal, intertesticular, 90-97 (94) long, 87-115 (101) wide. Ratio of ovary width to pharynx width 1:0.7-0.9 (1:0.8). Ratio of testes average width to ovary width 1:1.6-1.9 (1:1.7). Vitellaria follicular, cecal and extracecal, in 2 lateral fields extending from posterior margin of oral sucker to ovarian level. Uterus filling space delimited by ovary, oral sucker and caeca. Eggs small, oval, 23-28 x 14-18 (26 x 16). Ratio of body length to egg length 1:39-79 (1:54). Excretory vesicle opening by median pore at posterior end of body.

#### Taxonomic summary

*Host:* *Guira guira* (Gmelin) (Cuculidae).

*Locality:* La Marcela farm (26°17'35"S; 59°06'67"W), Formosa Province, Argentina.

*Site of infection:* cloaca.

*Specimens deposited:* MLP 5575.

#### Remarks

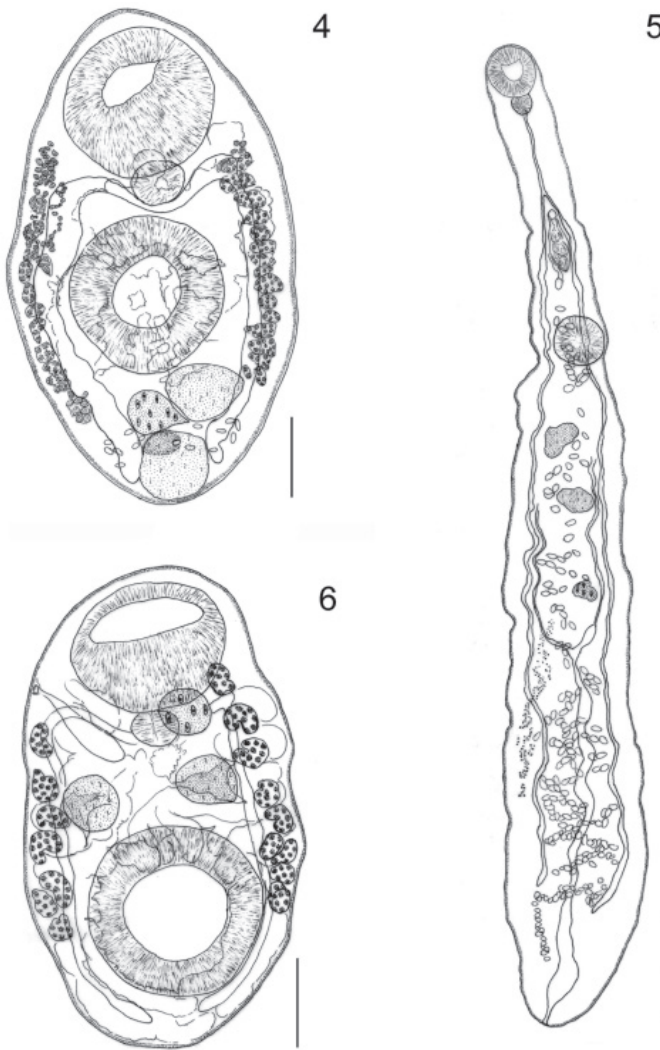
The species of the genus *Glaphyrostomum* Braun, 1901 (Brachylaimidae) have been reported parasitizing the intestine and the cloaca of birds from Nearctic, Neotropical and Oriental regions.

In the Neotropical region, 3 species have been reported in Brazil: *G. adhaerens* Braun, 1901 in *Rhopornis ardesiacus* (Wied-Neuwied) (cited as *Myiothera* sp.) (Thamnophilidae) and *Gallinula* sp. (cited as *G. kioloides* Puch) (Rallidae); *G. propinquum* collected in *Dendrocolaptes certhia* (Boddaert) (Dendrocolaptidae) and *G. pinto* (Travassos and Kohn, 1964) Yamaguti, 1971 in the cloaca of *Tinamus solitarius* (Vieillot) (Tinamidae) (described as *Cesarrema p.*) (Braun, 1901a, 1902; Travassos and Kohn, 1964; Yamaguti, 1971). The original descriptions of these species were summarized by Travassos et al. (1969), although the figures of *G. adhaerens* and *G. propinquum* were interchanged (figs. 260 and 261).

The morphological characters of the specimens of *G. propinquum* from *D. certhia* are in full agreement with those described in the present paper, except for the body size (2.7 mm), which may be related to their degree of contraction. In this paper, we present new morphometrical data of *G. propinquum* found in a new host, *G. guira*. This is the first report of this species since its original description and the first report of a species of *Glaphyrostomum* in Argentina.

*Athesmia heterolecithodes* (Braun, 1899) Looss, 1899 (Fig. 5)

Redescription based on 9 specimens from *G. guira*. Body elongate, flattened, 1.4-3.5 (2.7) mm long, 0.2-0.4 (0.3) mm wide; tegument aspinous, with papillae arranged irregularly in fore- and hindbody. Forebody 406-803 (589) long, occupying 15-29% (23%) of total body length. Hindbody 0.909-2.8 (2.0) mm long. Oral sucker subterminal, 107-183 (147) long, 98-169 (136) wide. Ventral sucker globular, feebly muscular, in anterior region of second quarter of body, nearly the same size as the oral sucker, 98-155 (139) long, 100-159 (135) wide. Sucker width ratio 1:0.8-1.1 (1:1). Ratio of body length to ventral sucker length 1:12-26 (1:19). Prepharynx absent; pharynx well developed, 45-60 (52) long, 36-57 (48) wide; esophagus long, 121-262 (200); caeca long winding, reaching to anterior middle of posterior quarter of body. Ratio of oral sucker length to pharynx length 1:2.6-3.3 (1:3). Testes slightly diagonal, in second quarter of body, irregular in shape or slightly lobed; anterior testis 51-138 (92) long, 73-95 (85) wide; posterior testis 63-139 (106) long, 63-100 (81) wide. Cirrus-sac well



**Figures 4-6.** 4, *Glaphyrostomum propinquum* Braun, 1901 from *Guira guira*, entire worm, ventral view. Scale-bar: 200  $\mu$ m. 5, *Athesmia heterolecithodes* (Braun, 1899) from *Guira guira*, entire worm, dorsal view. Scale-bar: 300  $\mu$ m. 6, *Stomylotrema vicarium* Braun, 1901 from *Busarellus nigricollis* entire worm, dorsal view. Scale-bar: 400  $\mu$ m.

developed, claviform, containing tubular and convoluted seminal vesicle, short pars prostatica surrounded by few gland cells, and well developed cirrus, 181-200 (188) long, 36-62 (51) wide. Ratio of body length to cirrus sac length 1:15-19 (1:17). Ratio of cirrus sac length to ventral sucker length 1:1.2-1.4 (1:1.3). Genital atrium shallow; genital pore posterior to caecal bifurcation, in first quarter of body. Ovary lobate, smaller than testes, posttesticular, submedian, immediately posterior to equatorial region, 75-92 (85) long, 58-112 (88) wide; oviduct long. Ratio of

testes average width to ovary width 1:0.7-1.5 (1:1). Ratio of cirrus sac width to ovary width 1:0.3-0.9 (1:0.6). Laurer's canal short, ascending, opening dorsally at ovarian level; seminal receptacle sacciform, 52-90 (68) long, 52-90 (74) wide. Vitellaria follicular composed of very small follicles distributed in 1 lateral field, extending throughout third quarter of body. Uterus coiled, extending from ovary to close to posterior extremity; opening in anterior extremity of genital atrium through a weakly muscular metraterm. Eggs numerous, small, oval, operculate, 15-35 x 9-24 (28 x 17). Ratio of ovary length to egg length 1:2.2-3.7 (1:2.8). Ratio of body length to egg length 1:55-118 (1:97). Excretory vesicle Y-shaped, bifurcating posterior to ovary. Excretory pore median, at posterior end of body.

#### Taxonomic summary

*Hosts:* *Milvago chimachima* (Vieillot) (Falconidae); *Rostrhamus sociabilis* (Vieillot) (Accipitridae) and *G. guira*.

*Locality:* La Marcela farm (26°17'35"S; 59°06'67"W), Pirané, Formosa Province, Argentina.

*Site of infection:* bile ducts.

*Specimens deposited:* MLP 5576

#### Remarks

This nearly cosmopolitan species of Dicrocoeliidae Odhner 1910 originally described from birds from the Old World (Teixeira de Freitas, 1962), has been reported from bird and mammalian hosts from Argentina. Digiani (2000) reported this species in 5 bird species from Buenos Aires Province: *Plegadis chihi* (Vieillot) (Threskiornithidae), *Jacana jacana jacana* (L.) (Jacanidae), *Aramides ypecaha* (Vieillot) (Rallidae), *Vanellus chilensis cayannensis* (Gmelin) (Charadriidae) and *Nothura maculosa* (Temminck) (Tinamidae).

The specimens of *A. heterolecithodes* studied here are smaller and their vitelline follicles are less developed than those described previously. This could be related to the wide range of intraspecific variation observed in this species (Teixeira de Freitas, 1962). The finding of *A. heterolecithodes* in *R. sociabilis* represents a new host record.

*Stomylotrema vicarium* Braun, 1901 (Fig. 6)

Redescription based on 3 specimens from *B. nigricollis* and 1 specimen from *B. meridionalis*. Body oval, 1.7-2.5 (2.1) mm long, 1.2-1.3 (1.3) mm wide; tegument aspinous. Forebody 0.9-1.4 (1.1) mm long, occupying 50-55 % (53 %) of total body length. Hindbody 203-275 (238) long. Oral sucker subterminal, round, 532-619 (577) long, 600-725 (674) wide. Ventral sucker larger than oral sucker, in

middle posterior of body, 696-870 (774) long, 764-861 (812) wide. Sucker width ratio 1:1.1-1.4 (1:1.2). Ratio of body length to ventral sucker length 1:2.5-2.9 (1:2.7). Prepharynx short, 48 long; pharynx well developed, 135-193 (158) long, 193-203 (200) wide; esophagus short, sacciform; caeca surround ventral sucker, reaching posterior extremity of body. Ratio of oral sucker length to pharynx length 1:3.2-4.0 (1:3.7). Testes symmetrical, round or oval, intercecal, immediately pre-equatorial; poral testis 208-232 (222) long, 232-290 (254) wide; aporal testis 193-227 (208) long, 217-256 (238) wide. Cirrus sac large, claviform, oblique, near anterior end of body, containing tubular and coiled seminal vesicle, 401-555 (469) long, 121-126 (124) wide. Ratio of oral sucker length to cirrus sac length 1:1.1-1.3 (1:1.2). Genital atrium small. Genital pore on dextral margin of body close to anterior extremity. Ovary round, located in first third of body, anterior to aporal testis, 155-217 (184) long, 193-232 (214) wide. Ratio of ovary width to pharynx width 1:0.95-1.14 (1:1.07). Ratio of testes average width to ovary width 1:1.1-1.4 (1:1.2). Ratio of cirrus sac width to ovary width 1:0.54-0.63 (1:0.58). Uterine seminal receptacle present; ootype surrounded by Mehlis' gland, on middle line of body in ovary-testicular region. Laurer's canal short, opening at dorsal surface of body, near Mehlis' gland. Vitelline follicles oval or lobed, situated on each sides of body, extending from posterior border of oral sucker or ovarian level to middle or posterior border of ventral sucker; 7 poral follicles, extending posteriorly to genital pore, 9 aporal follicles, extending from anterior level of ovary to mid-level of ventral sucker. Uterine coils occupy entire region between oral sucker and posterior end of body. Eggs small, yellow-brown, oval, operculated, 26-29 x 14-17 (27 x 15). Ratio of body length to egg length 1:61-97 (1:79). Excretory vesicle and pore not seen.

### Taxonomic summary

*Hosts:* *Busarellus nigricollis* (Latham), *Buteogallus meridionalis* (Latham) (= *Heterospizias m.*) (Accipitridae).

*Locality:* La Marcela farm (26°17'35"S; 59°06'67"W), Pirané, Formosa Province, Argentina.

*Site of infection:* cloaca.

*Specimens deposited:* MLP 5577 and MLP 5743.

### Remarks

Seven species of *Stomylotrema* Looss, 1900 have been reported for the Neotropical region: *S. vicarium*, *S. bijugum* Braun, 1901, *S. fastosum* Braun, 1901, *S. tagax* Braun, 1901, *S. perpastum* Braun, 1902, *S. gratiosus* Travassos, 1922 and *S. ucremium* Brenes, Arroyo and Muñoz, 1966.

The morphology and the metric characters of the specimens re-described in this study agree with the descriptions of *S. vicarium* by Braun (1902) and Macko et al. (1999), and differ from the specimens described by Szidat (1964) and Ostrowski de Núñez (1978) in having a smaller body size. Macko et al. (1999), reported high levels of variation in all metrical characters for all *Stomylotrema* spp.

*Stomylotrema vicarium* was found naturally parasitizing the intestine and cloaca of *Theristicus caerulescens* (Vieillot) (Threskiornithidae), *Ciconia maguari* (Gmelin) and *Jabiru mycteria* (Lichtenstein) (Ciconiidae) from Brazil; *Egretta caerulea* (L.) (Ardeidae) and *Tachybaptus dominicus* (L.) (cited as *Podiceps dominicus dominicus* (L.)) (Podicipedidae) from Cuba, and *Larus dominicanus* Lichtenstein (Laridae) from Argentina (Braun, 1901b; Travassos, 1922, 1928; Szidat, 1964; Travassos et al., 1969; Macko et al., 1999). In addition, *Vanellus chilensis* (Molina) (Charadriidae) and *Gallus gallus domesticus* (L.) (Phasianidae) were reported as experimental hosts by Ostrowski de Núñez (1978). The finding of *S. vicarium* parasitizing *B. nigricollis* and *B. meridionalis* represents 2 new host records and the first report in falconiform birds.

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