Description of a new species of *Tylodelphys* (Digenea, Diplostomidae) in the wood stork, *Mycteria americana* (Aves, Ciconiidae) from Argentina

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Abstract

During the course of a study on the endohelminth parasites of birds, specimens of an undescribed species of *Tylodelphys* Diesing, 1850 (Diplostomidae) were collected from the wood stork, *Mycteria americana* L., from Formosa Province, Argentina. *Tylodelphys brevis* sp. nov. can be distinguished from the other Neotropical species of this genus, *T. elongata*, *T. americana* and *T. adulta*, principally by the smaller size of the body (570–851 µm), by the fewer eggs in the uterus (1–2) and by the smaller ratio of body to egg length (6–8). This is the second report of an adult of the genus *Tylodelphys* from Argentina and the first record of a digenean species parasitizing *Mycteria americana* in this country.

Keywords

Tylodelphys brevis sp. nov., Diplostomidae, Digenea, *Mycteria americana*, Ciconiidae, Formosa Province, Argentina

Introduction

Mycteria americana L., 1758, commonly known as the wood stork or cigüeña de cabeza pelada, is a ciconiid bird distributed in wetlands of the Western Hemisphere from the south-eastern USA and Mexico through Central America and South America to Central Argentina (del Hoyo *et al.* 1992). Adult wood storks eat small fishes, frogs, molluscs, snails, insects and aquatic invertebrates. In Neotropical region, only four species of the superfamily Diplostomoidea have been reported from this host: *Strigea nugax* Szidat, 1928 and *Parastrigea caballeroi* Dubois, 1952, members of the family Strigeidae; and *Tylodelphys americana* (Dubois, 1936) Dubois, 1937 and *T. elongata* (Lutz, 1928) Dubois, 1937, members of the family Diplostomidae (Dubois 1938, Caballero y C. and Vogelsang 1949, Caballero y C. and Díaz-Ungría 1958, Corrêa Gomes and de Oliveira Rodrigues 1981, Lamothe-Argumedo and Jaimes Cruz 1982).

The aim of the present paper is to describe a new diplostomid digenean species parasitizing *M. americana* from Argentina.

Materials and methods

One adult specimen of *Mycteria americana* was collected with a shotgun during a survey of birds in Clorinda (25°17'S, 57°43'W), Formosa Province, Argentina in September 2004. The bird was eviscerated and the viscera fixed with 10% formalin. The digenean specimens collected were stained with hydrochloric carmine, dehydrated and mounted in Canada balsam. Measurements are in micrometers (µm), unless otherwise stated, as the mean followed by the range in parentheses. Drawings were made with the aid of a drawing tube. The host and the parasites studied were deposited in the Ornithological and Helminthological Collections of the Museo de La Plata (MLP), La Plata, Argentina, respectively.

Tylodelphys brevis sp. nov. (Figs 1–3, Table I)

Description (based on 11 specimens): Body linguiform, indistinctly bipartite and tegument smooth, 646 (570–851; n = 13) in total length. Forebody slightly spatulate, longer than hindbody, 411 (371–507; n = 10) by 233 (202–280; n = 10) wide

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Figs 1–3. *Tylodelphys brevis* sp. nov. from *Mycteria americana*: **1.** Holotype, entire worm, ventral view. **2.** Enlarged dorsal view of proximal female genitalia. **3.** Enlarged lateral view of terminal genitalia. Scale bars = 100 μ m (1), 50 μ m (2, 3). Abbreviations: ag – genital atrium, at – anterior testis, e – egg, gc – genital cone, gp – genital pore, hd – hermaphroditic duct, Lc – Laurer's canal, Mg – Mehlis' gland, o – ovary, pt – posterior testis, rv – vitelline reservoir, sv – seminal vesicle, u – uterus

at acetabular level. Hindbody conical, 248 (174–343; $n = 10$) long by 210 (169–275; $n = 10$) wide at anterior testis level. Oral sucker subterminal, 56 (40–67; $n = 12$) long by 56 (44–69; $n = 12$) wide, always larger than ventral sucker. Ventral sucker pre-equatorial, 31 (24–36; $n = 11$) long by 40 (27–54; $n = 11$) wide. Sucker width ratio, 1:1.4 (0.9–2). Distance between ventral sucker and anterior extremity, 245 (207–300; $n = 9$). Pseudosuckers well developed, reniform, 60 $\times$ 43 (48–74 $\times$ 29–59; $n = 11$), 9.4% (7.7–11.3%) of body length. Holdfast organ round to elliptical with median slit, 93 $\times$ 75 (69–131 $\times$ 50–102; $n = 9$), 14.5% (10.2–19%) of body length. Distance between ventral sucker and holdfast organ, 31 (17–48; $n = 10$). Prepharynx absent; pharynx large, 50 $\times$ 28 (45–57 $\times$ 22–31;

$n = 10$), oesophagus short, 13 (10–15; $n = 5$), caeca slender extending to anterior margin of copulatory bursa. Copulatory bursa not protrusible, with genital pore terminal, enclosing small genital cone and hermaphroditic duct. Testes tandem, extended transversally occupying whole width of hindbody; anterior testis, 52 $\times$ 183 (41–71 $\times$ 133–226; $n = 8$); posterior testis 49 $\times$ 155 (34–83 $\times$ 121–202; $n = 9$). Ovary round to oval, to right of middle line, pretesticular, 44 $\times$ 56 (34–53 $\times$ 29–78; $n = 8$). Laurer's canal short, opening laterally to ovary on dorsal surface; Mehlis' gland lateral to anterior testis. Uterine seminal receptacle present. Vitellarium follicular, in fore- and hindbody; in forebody extend from nearly midway between intestinal bifurcation and ventral sucker, follicles scarce ante-

Table 1. Comparative measurements (ranges) of *Tylodelphys* species from Neotropical birds

	<i>T. brevis</i> sp. nov.	<i>T. elongata</i>	<i>T. americana</i>	<i>T. adulta</i>
Body length	570–851	1.5–2.35 mm	0.9–2.4 mm	1.123–1.464 mm
Forebody	371–507 × 202–280	0.800–1.12 mm × 450–520	0.550–1.5 mm × 290–780	720–950 × 430–595
Hindbody	174–343 × 169–275	450–650 × 43–52	310–900 × 250–650	269–528 × 394–557
Oral sucker	40–67 × 44–69	80–100 × 90–104	48–87 × 48–95	71–97 × 83–103
Ventral sucker	24–36 × 27–54	70–90 × 99–110	33–76 × 36–108	60–80 × 78–97
Pseudosuckers	48–74 × 29–59	110–210 × 80–130	50–122 × 68–80	145–216 × 74–126
Holdfast organ	69–131 × 50–102	160–210	115–390 × 110–510	195–250 × 178–274
Prepharynx	absent	absent	12	absent
Pharynx	45–57 × 22–31	63–73 × 60–68	49–80 × 33–72	71–110 × 53–74
Oesophagus	10–15		40	25
Ovary	34–53 × 29–78	75–125 × 95–200	63–135 × 80–90	73–83 × 73–97
Anterior testis	41–71 × 133–226	100–140 × 445–460	110–300 × 270–575	120–121 × 216–494
Posterior testis	34–83 × 121–202	110–180 × 400–445	110–290 × 240–520	115–168 × 211–427
Eggs	83–102 × 45–64	90–97 × 60–66	84–103 × 53–63	87–99 × 51–59
Egg number	1–2	15	30	1–20
Distances				
Ventral sucker-anterior end	207–300			
Ventral sucker-holdfast organ	17–48			
Ratios				
Hindbody/forebody length	0.4–0.8	0.55–0.72 (0.60)	0.38–0.80	0.28–0.64
Sucker width	0.9–2	subequal		
Body/pseudosuckers length	9–13	10–12	13–31	5.5–8.5
Pseudosuckers/oral sucker length	0.8–1.9			
Pseudosuckers/pharynx length	1–1.5	2	1–2	
Body/holdfast organ length	5.3–9.8	5.8–5.9		
Forebody/holdfast organ length	3.3–5.9	5–5.3	2.77–5.87	
Oral sucker/pharynx length	0.8–1.4			
Body/egg length	6–8	19–21*	23–28*	12–16
Hosts	<i>Mycteria americana</i> L.	<i>Tachybaptus dominicus</i> (L.) <i>Jabiru mycteria</i> (Lichtenstein) <i>Mycteria americana</i>	<i>Mycteria americana</i> <i>Jabiru mycteria</i>	<i>Podiceps major</i> (Boddaert)
Localities	Argentina	Brasil, Venezuela, Cuba	Brasil, Venezuela, México	Argentina
References	present study	Dubois (1970)	Dubois (1970)	Lunashi and Drago (2004)
		Dubois and Macko (1972)	León-Régagnon (1992)	

*Calculated from descriptions given by Dubois (1970).

rior to level of ventral sucker and more concentrated around holdfast organ; in hindbody few follicles in mid-ventral region. Uterus without eggs or containing 1–2 large eggs, 94×56 ($83\text{--}102 \times 45\text{--}64$; $n = 10$), 15% (12.3–17.3%) of body length. Excretory vesicle and pore not seen.

Type host: *Mycteria americana* L. (Aves, Ciconiiformes, Ciconiidae).

Type locality: Clorinda ($25^{\circ}17'S$, $57^{\circ}43'W$), Formosa Province, Argentina.

Site of infection: Small intestine.

Type specimens: Holotype, MLP 5741; paratypes MLP 5742.

Etymology: The specific name refers to the small size of the species.

Remarks: The genus *Tylodelphys* Diesing, 1850 was created to include species characterized by having an indistinctly bipartite body, well developed pseudosuckers, non-trilobate anterior extremity and a copulatory bursa enclosing a small genital cone with a hermaphroditic duct opening terminally. It is cosmopolitan and has been found parasitizing numerous species of falconiforms, ciconiiforms, podicipediforms, anseriforms, gaviiforms and strigiforms (Odening 1962, Dubois 1970, Niewiadomska 2002).

To date, of the 14 species of *Tylodelphys* known worldwide, only three have been reported from Neotropical region, parasitizing podicipediform and ciconiiform birds. *Tylodelphys americana* (Dubois, 1936) Dubois, 1937 was found parasitizing ciconiids from Brazil and Venezuela and podicipedids from México; *T. elongata* (Lutz, 1928) Dubois, 1937 in podicipedid birds from Cuba, Venezuela and Brazil and ciconiid birds from Venezuela and Brazil; and *T. adulta* Lunaschi et Drago, 2004 in podicipedids from Argentina (Lutz 1928, Pérez Vigueras 1944, Caballero y C. and Vogelsang 1949, Travassos *et al.* 1969, Dubois 1970, Dubois and Macko 1972, Corrêa Gomes and de Oliveira Rodrigues 1981, Lamothe-Argumedo and Jaimes Cruz 1982, León-Régagnon 1992, Lunaschi and Drago 2004).

Utilizing the descriptions given by Dubois (1970) and Lunaschi and Drago (2004) *Tylodelphys brevis* sp. nov. can be separated from all Neotropical species principally by having a smaller body size, by the relative size of its organs, by having few eggs in the uterus (1–2) and by a smaller body/egg length ratio (Table I). In addition, *T. americana* can be distinguished from the new species by having a small copulatory bursa delimited by a conspicuous constriction, by the presence of a prepharynx, by having a long oesophagus and by the more extensive distribution of vitelline follicles in the forebody, occupying 60–83% of the forebody vs. 42–54%. *Tylodelphys elongata* can be differentiated from the new species by the arrangement of the vitelline follicles in the forebody, which are more anteriorly distributed, occupying 75% of the forebody. *Tylodelphys adulta* differs from *T. brevis* sp. nov. by the distribution of vitelline follicles, which never reach anteriorly to the ventral sucker, by having larger pseudosuckers, by the presence of minute spines on the forebody and oral sucker and by a smaller body length/pseudosuckers length ratio.

In addition, Dubois (1978) described specimens collected from *Busarellus nigricollis* (Latham) (Accipitridae) from Colombia as *Diplostomum (Tylodelphys)* sp., providing no detailed drawings of them. These specimens are similar in size to the specimens described here (body $760\text{--}900 \times 260\text{--}300$, oral sucker $48\text{--}55 \times 54\text{--}63$, ventral sucker $42\text{--}50 \times 50\text{--}57$, pseudosuckers $57\text{--}73 \times 31\text{--}45$, holdfast organ $80\text{--}115 \times 80\text{--}120$, pharynx $37\text{--}47 \times 34\text{--}37$, ovary $40\text{--}42 \times 100\text{--}110$, anterior testis $75\text{--}95 \times 165\text{--}210$, posterior testis $100\text{--}125 \times 140\text{--}200$), but differ in the distribution of the vitelline follicles in the forebody, which extend to the level of the intestinal bifurcation.

The life cycles of *Tylodelphys* species include fishes and amphibians as second intermediate hosts. No full life cycle have been studied in Argentina. However, metacercariae of six species of *Tylodelphys* have been described naturally parasitizing the brain, pericardial cavity or visceral cavity of freshwater fishes: *Tylodelphys destructor* Szidat et Nani, 1951, *T. barilochensis* Quaggiotto et Valverde, 1992, *T. crubensis* Quaggiotto et Valverde, 1992, *T. argentinus* Quaggiotto et Valverde, 1992, *T. jenynsiae* Szidat, 1969 and *T. cardiophilus* Szidat, 1969 (Szidat and Nani 1951, Szidat 1969, Quaggiotto and Valverde 1992, Ortubay *et al.* 1994, Flores and Bacallá 1998). Of the six species mentioned above, only *T. jenynsiae* and *T. cardiophilus* share their geographical distribution with the new species. Unfortunately, is not possible to compare them with *T. brevis* sp. nov. because their adults are unknown.

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