

First record of *Australapatemon burti* and *Paramonostomum pseudalveatum* (Digenea) from *Anas georgica* (Aves, Anseriformes) in Chile

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Abstract

An examination of specimens of *Anas georgica* Gmelin (Anatidae) from Región del Bio-Bio and Región del Maule, Chile, revealed the presence of two digenean species reported for the Holarctic Region: *Australapatemon burti* (Miller, 1923) Dubois, 1968 (Strigeidae) and *Paramonostomum pseudalveatum* Price, 1931 (Notocotylidae). *A. burti* parasitized ducks from both regions and *P. pseudalveatum* parasitized only ducks from Región del Bio-Bio. The digeneans were mounted *in toto*, described and illustrated. The morphology and dimensions of specimens studied correspond with their original descriptions and new morphometrical data and morphological characters are given. The reports of *A. burti* and *P. pseudalveatum* in *A. georgica* represent a new host record and the first record of the genera *Australapatemon* Sudarikov, 1959 and *Paramonostomum* Lühe, 1909 from Chile.

Key words

Digenea, *Australapatemon burti*, *Paramonostomum pseudalveatum*, Anatidae, *Anas georgica*, Chile

Introduction

The yellow-billed pintail, *Anas georgica* Gmelin (Anatidae), is distributed from southern Colombia to the Argentinean-Chilean Patagonia. It inhabits the shores of rivers, lakes, lagoons and other freshwater bodies up to 1000 m alt. and is catalogued as one of the most widespread species of ducks in Chile (Couve and Vidal 2003). In spite of its common occurrence, *A. georgica* has not been subject at any parasitological research. Moreover, reports of the parasitic fauna of anatid birds from Chile are limited to nematode: *Amidostomum anseris* Zeder, 1800 found in the black-necked swan, *Cygnus melanocorypha* (Molina) and *Heterakis dispar* (Schrank, 1790) found in lesser upland goose, *Chloephaga picta picta* (Gmelin) (Schlatter *et al.* 1991, González *et al.* 2005). Prior to this study, only *Psilochasmus oxyurus* (Creplin, 1825) Lühe, 1910 (Digenea) and *Cloacotaenia megalops* (Nitzsch in Creplin, 1829) (Cestoda) were reported in *A. georgica* from Argentina and Brazil, respectively (Szidat 1957, Muniz-Pereira and Amato 1998).

The aim of this paper is to report taxonomic data for two digenean species found parasitizing *A. georgica* from Chile for the first time and to present new morphological features for these species.

Materials and methods

Sixty-five yellow-billed pintail, *A. georgica* Gmelin were killed using a shotgun between May and August 2004 from Región del Maule and Región del Bio-Bio, Chile, according to the rules of Chilean Hunting Law N° 19.473. The birds were dissected and examined under a stereoscopic microscope in the laboratory. The digenean specimens collected were fixed in 5% hot formalin and, without being compressed, stained with a 1:6 dilution in 96% ethanol of hydrochloric carmine, dehydrated and mounted in Canada balsam. The specimens were mounted between two microscope cover glasses in order to facilitate handling and observation. Measurements were given in micrometers (μm) unless otherwise stated, as the

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range followed by the mean in parentheses. Drawings were made with the aid of a drawing tube. The material studied was deposited in the Colección Helminológica del Museo de La Plata (MLP), La Plata, Argentina.

Results

Family Strigeidae Railliet, 1919

Genus *Australapatemon* Sudarikov, 1959

Australapatemon burti (Miller, 1923) Dubois, 1968 (Figs 1A, B)

Redescription: Based on 13 specimens. Body distinctly bipartite, 0.9–1.4 mm (1.2) in total length. Tegument smooth. Forebody calyciform, 413–580 (480) long by 355–454 (403) wide. Hindbody 1–2 times longer than forebody, 444–870 (737) long by 343–503 (418) wide. Ratio of hindbody length to forebody length 1:1–2.1. Oral sucker subterminal, 78–109 (93) long by 80–107 (93) wide. Ventral sucker situated in posterior middle of forebody, 95–155 (119) long by 87–167 (120) wide. Suckers width ratio 1:1–1.7. Holdfast organ with two lobes; associated proteolytic gland at base of forebody, 13–62 (37) long by 87–117 (99) wide. Prepharynx absent. Pharynx

small, feebly muscular, sometimes not easily observed, 34–49 (43) long by 31–41 (38) wide. Oesophagus short. Intestinal bifurcation anterior to ventral sucker, caeca long. Ratio of oral sucker length to pharynx length 1:2–2.3.

Testes tandem, large; lobed, anterior testis asymmetrical, with one dorsal right lobe, 138–202 (172) long by 207–304 (254) wide; posterior testis larger than anterior, asymmetrical and bilobed, with right lobe longer and folded upon itself, 144–190 (167) long by 120–290 (219) wide. Seminal vesicle tubular, convoluted and located in post-testicular region. Ovary ovoid or reniform, transversely elongate, median, 62–109 (84) long by 82–167 (126) wide. Laurer's canal short, opening on the dorsal surface in gonadal region. Mehlis' gland lateral to anterior testis. Vitellarium follicular, densely distributed in hindbody, occupying entire preovarian region and extending posteriorly in two ventro-lateral fields to level of copulatory bursa. Vitelline reservoir intertesticular. Uterus with 1–5 large eggs; eggs 93–119 (103) long by 48–69 (59) wide. Copulatory bursa large with dorso-subterminal or terminal opening. Genital cone large, 167–190 (178) long by 155 (155) wide, one-fifth of hindbody length, enclosing long ejaculatory duct with internal rugae; ejaculatory duct 36–55 (49) wide. Genital atrium shallow, 53 long. Excretory vesicle and pore, not seen.

Localities: Región del Maule: Parral (36°08' S, 71°50' W), Quella (36°03' S, 72°05' W); Región del Bio-Bio: Aeródromo

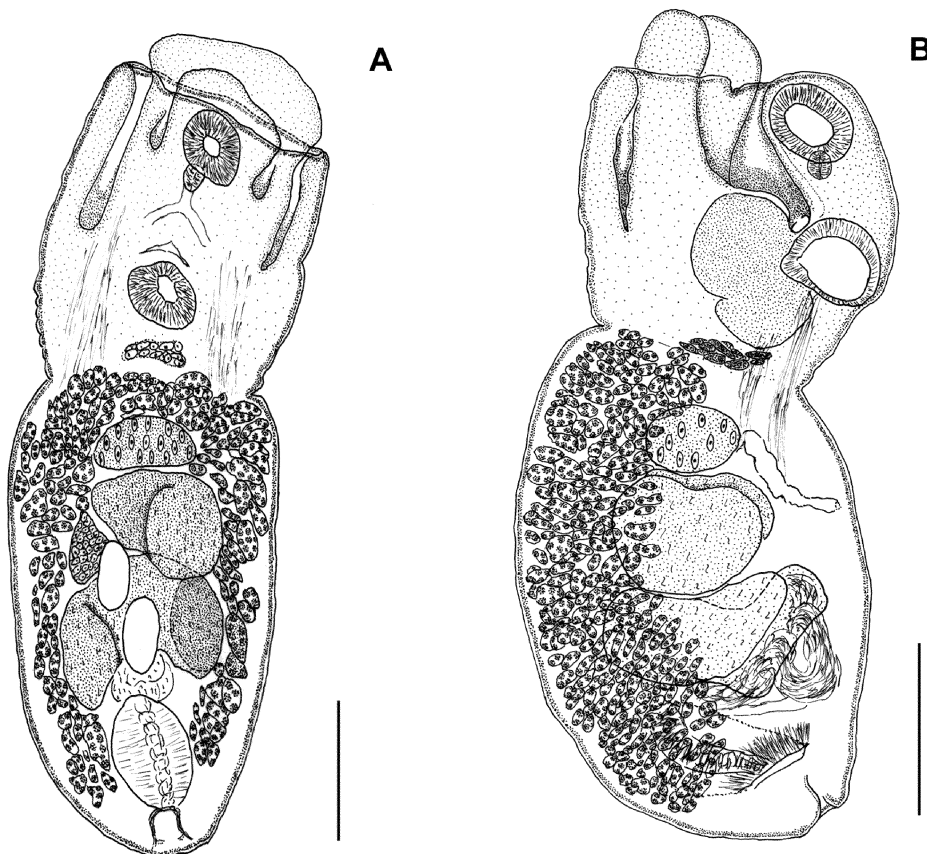


Fig. 1. *Australapatemon burti*: A – entire worm, ventral view. Scale bar = 200 μ m. B – entire worm, lateral view. Scale bar = 200 μ m

Chillán (36°34'S, 72°03'W), Ñiquén (36°13'S, 72°03'W), San Nicolás (36°29'S, 72°13'W).

Site of infection: Small intestine.

Material deposited: In Colección Helmintológica del Museo de La Plata 5532.

Prevalence: 16 of 65 (24.6%).

Range of infection (mean intensity): 1–108 (9.6).

Remarks

At present, the genus *Australapatemon* Sudarikov, 1959 includes nine species reported as parasites of birds: *A. minor* Yamaguti, 1933 in Anatidae from Oriental and Palaearctic regions; *A. bdello cystis* (Lutz, 1921) in Anatidae, Ardeidae and Laridae from Neotropical region; *A. fuhrmanni* Dubois, 1937 in Anatidae from Palaearctic and Ethiopic regions; *A. canadensis* Dubois et Rausch, 1950 in Anatidae from Nearctic region; *A. congolensis* Dubois et Fain, 1956 in Anatidae from Ethiopic region; *A. intermedius* (Johnston, 1904) in Anatidae from Australian region; *A. anseris* Dubois, 1967 in Anatidae from Palaearctic region; *A. burti* (Miller, 1923) in Anatidae from Nearctic region and *A. magnacetabulum* Dubois, 1988 in Strigidae and Accipitridae from Neotropical region (Szidat 1929; Gower 1939; Dubois 1937, 1938a, b, 1967, 1968, 1970, 1974, 1978, 1985, 1988; Dubois and Rausch 1950; Dubois and Angel 1972; Caballero y C. and Díaz-Ungria 1958; Mawson *et al.* 1986).

Australapatemon fuhrmanni, *A. canadensis*, *A. anseris* and *A. congolensis* differ from our specimens of *A. burti* obtained from *A. georgica* by having a muscular ring in the genital atrium (ringnapf). *A. intermedius* differs from *A. burti* by having a larger size (up to 5 mm long), by the presence of multilobed testes and by the ratios of hindbody to forebody length (1:2–2.5 compared with 1:1–1.7) and ventral sucker to oral sucker width (1:2 compared with 1:1–1.7). *A. magnacetabulum* from Paraguay differs from the specimens here described by the size of the hindbody (660–950 µm long by 270–310 µm wide), ventral sucker (130–200 µm long by 105–170 µm wide), pharynx (70–73 µm long by 55–68 µm wide), proteolytic gland (120–190 µm long by 90–95 µm wide), anterior testis (75–165 µm long by 105–175 µm wide), genital cone (115–165 µm long by 115–150 µm wide) and genital atrium (100–120 µm long). *A. minor* differs from the strigeids from *A. georgica* by the size of the body (up to 2.5 mm long), anterior testis (99–306 µm long by 70–326 µm wide), posterior testis (130–408 µm long by 99–367 µm wide) and genital cone (150–280 µm long by 120–190 µm wide). *A. bdello cystis* differs from the specimens here studied by the shape of testes described as not lobed by Szidat (1929) and Dubois (1968, 1970) and grossly lobed by Dubois (1985). The morphological and metrical characters of specimens obtained from *A. georgica* are in full agreement with those of *A. burti* from *Anas discors* L., *A. crecca carolinensis* Gmelin, *A. penelope* L., *A. rubripes* Brewster, *A. americana* Gmelin and *Aythya affinis* (Eyton), *Cygnus columbianus* (Ord) and *Melanitta nigra* (L.) from USA and Canada described by Dubois (1968).

The present report has enabled us to augment the original description with new morphological data (shape of seminal vesicle, location of Mehlis' gland and Laurer's canal) and morphometrical data (size of proteolytic gland).

The report of *A. burti* from *A. georgica* represents a new host record and the first report of the genus *Australapatemon* in Chile.

Family Notocotyliidae Lühe, 1909

Genus *Paramonostomum* Lühe, 1909

Paramonostomum pseudalveatum Price, 1931 (Fig. 2)

Description: Based on 21 specimens mounted *in toto*, 10 measured. Body ovoid, dorsoventrally flattened with margins slightly curved ventrally; anterior extremity attenuated, posterior rounded, 365–547 (492) long by 221–403 (320) wide; tegument aspinous; dark pigment dispersed all over body surface, more abundant in anterior one-third. Ventral glands or glandular ridges absent. Oral sucker globular, terminal, 34–53 (44) long by 28–53 (43) wide. Pharynx absent. Oesophagus short, 26–39 (31) long. Caeca long, simple, extending posteriorly between ovary and testes. Ratio of body length to oral

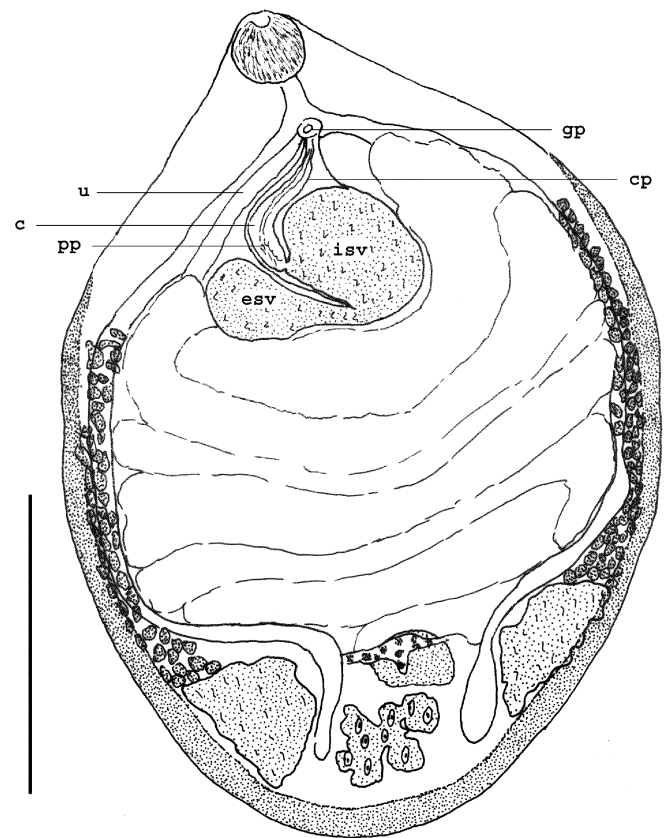


Fig. 2. *Paramonostomum pseudalveatum*, entire worm, ventral view. Scale bar = 200 µm. Abbreviations: c – cirrus, cp – cirrus pouch, esv – external seminal vesicle, gp – genital pore, isv – internal seminal vesicle, pp – pars prostatica, u – uterus

sucker length 1:10–13. Testes posterolateral, elongate, feebly lobed, extracaecal; right testis 87–121 (99) long by 48–78 (62) wide; left testis 78–111 (94) long by 48–78 (63) wide. External seminal vesicle present; cirrus pouch elongate, occupying the anterior-third of body, 90–145 (112) long by 31–50 (40) wide; everted cirrus not seen. Ratio of body length to cirrus pouch length 1:3–5; genital pore median, ventral, posterior to oral sucker, in oesophageal bifurcation. Ovary irregular in outline, lobed or not, median, intercaecal, intertesticular, 44–107 (73) long by 37–97 (71) wide; Mehlis' gland anterior to ovary; uterus forming 4–7 transverse loops between ovarian region and cirrus pouch; metraterm thin walled, parallel or ventral to cirrus pouch, opening into genital atrium; follicular vitelline glands, extracaecal, longitudinal, extending in two lateral bands from testes to the level of the cirrus sac; lateral bands 116–230 (177) long; eggs operculate, with long polar filament at each pole and embryonated, 19–22 (20) long by 11–13 (12) wide. Excretory pore subterminal, excretory vesicle not seen.

Locality: Tubul (37°14'S, 73°25'W), Región del Bio-Bio, Chile.

Site of infection: Small intestine.

Material deposited: In Colección Helmintológica del Museo de La Plata 5533.

Prevalence: 5 of 65 (7.7%).

Range of infection (mean intensity): 80–580 (137).

Remarks

Harwood (1939) grouped the species of *Paramonostomum* Lühe, 1909 into two groups: the *alveatum* and the *elongatum*. The former includes specimens with relatively short, oval-shaped bodies and vitellaria extending as far as the cirrus pouch. The latter comprises species with elongate, spatulate-shaped bodies and shorter vitelline bunches. The specimens described here clearly belong to the *alveatum* group. At present, *P. ionorne* Travassos, 1921 reported parasitizing gruiforms and charadriiforms birds from Brazil, Venezuela and Patagonia is the only species from the *alveatum* group reported from the Neotropical Region; and has a larger body size (3.2 mm long by 1.5 mm wide), than the species reported here (Baylis 1928, Travassos *et al.* 1969, Yamaguti 1971).

Based on metrical characters, the specimens obtained from *A. georgica* are comparable to *P. parvum* Stunkard et Dunihue, 1931, *P. alveatum* (Mehliss in Creplin, 1846) and *P. pseudalveatum* Price, 1931. *Paramonostomum parvum* and *P. alveatum* differ from the specimens here studied by having minute spines on the ventral surface of the body and by having more uterine loops (10–12) (Harwood 1939, Stunkard 1967). Our specimens from *A. georgica* are similar to *P. pseudalveatum* by having an aspinous tegument and 4–7 (6) uterine loops. Consequently, we assigned them to this species. *P. pseudalveatum* was described from adults obtained from the American muskrat, *Ondatra zibethica* (L.) from USA (Price 1931, Harwood 1939). This species was also reported in the birds, *Branta canadensis* (L.), *Aythya nyroca* (Guldenstadt) and *Anas penelope* L., from Canada, Estonia and Finland,

respectively (Swales 1933; Yamaguti 1971; Brglez and Valtonen 1985, 1987).

The muskrat was first introduced to Argentine side of Tierra del Fuego Island in 1948 from Port Rowan, Ontario, Canada. It subsequently invaded the Chilean side. The muskrat is presently confined to Tierra del Fuego and surrounding islands in South America (Jaksic *et al.* 2002). The finding of *P. pseudalveatum* in *A. georgica* suggests that the parasitic fauna of the muskrat, may have been introduced to Chile.

The report of *P. pseudalveatum* from *A. georgica* represents a new host record and the first report of the genus *Paramonostomum* in Chile.

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