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Two digenetic trematodes with description of a new species from *Anas platyrhynchos* (Anseriformes: Anatidae) in Sindh, Pakistan

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Abstract

In result of ongoing helminthological studies of mallard *Anas platyrhynchos* of Kambar Shahdadhkot District of Sindh Province, Pakistan, a total of 57 birds were captured from different localities. During examination of gut contents and visceral organs, 68 specimens of *Psilochasmus oxyurus* were collected from intestine and 13 specimens of *Paratanaisia ishaquei* n.sp. were collected from kidneys of the host bird.

P. ishaquei n.sp. differs from its close allies in body shape and size; v-shaped ovary; lung shaped testes; distribution of vitellaria composed of two unequal bands commencing from level of intestinal fork, running in lateral field of body and egg larger in size. On the basis of these diagnostic differences, a new species *P. ishaquei* is proposed. This genus is being reported for the first time from Pakistan.

Trematodes of genus *Psilochasmus* were identified as *P. oxyurus*. Previously this genus was reported by Bhutta and Khan, 1975 from same bird of Pakistan. However, this is the second report of the genus *Psilochasmus* from Pakistan.

Keywords: *Paratanaisia ishaquei* n. sp., *Psilochasmus oxyurus*, *Anas platyrhynchos*, Sindh, Pakistan

Introduction

Family Eucotylidae was established by Cohn (1904) for adult worms found in the urinary tubules of Kidneys of aquatic birds. Jones *et al.*, 2005^[1]. *Paratanaisia* spp. (Santos, 1934; Freitas, 1959) are digenetic trematodes that inhabit the kidneys of birds. Travassos *et al.*, 1969;^[2] Fedynich *et al.*, 1996)^[3]

Reports on the species of the genus *Paratanaisia* out of Pakistan are limited to those of Fischthal and Kuntz, 1976;^[4] Abdo and Sultan, 2013^[5] and Gomes *et al.*, 2005.^[6] There is no record of genus *Paratanaisia* from Pakistan

Family Psilostomidae was proposed by Loss (1900) to include Psilostomum Looss, 1899, comprising three species from birds. Odhner (1913) revised the Psilostomidae, refined genetic concept of Psilostomum. Jones *et al.*, 2005^[1]

Type species *P. oxyurus* (Crepl, 1825) Luhe, 1909 reports on the species of the genus *Psilochasmus* include *Anas marila* of Germany. Also in other Anatids of Europe, U.S.A., W. Siberia, China, India and Egypt. Yamaguti^[7].

The mallard (*Anas platyrhynchos*) is a member of order Anseriformes (ducks, geese and swans) and is generally bound to open waters and wetland habitats. Mallard *Anas platyrhynchos* is migratory in nature and depends upon variety of food items during migration from Siberia to Asian states. During its stopover habitats it shares variety of food items including small invertebrates, tadpoles, small fishes and all type of plant materials.

Material and methods

Live Fifty-seven Mallard *Anas platyrhynchos* (Anseriformes: Anatidae) were collected from different water bodies of Kambar–Shahdadhkot District of Sindh, Pakistan during winter season (2014–2015) and examined for the endohelminths. During examination of gut content and visceral organs a total of 68 trematodes belonging to genus *Psilochasmus* were collected from intestine and 13 trematodes belonging to genus *Paratanaisia* were collected from kidneys of host birds. The trematodes collected were fixed in 70% ethanol, stained with borax carmine, dehydrated in graded alcohol series, cleared in clove oil and Xylol. Specimens were permanently mounted in Canada balsam. The drawing lines were made with camera Lucida

And photographs taken with Sony digital camera. The measurements were taken in millimeter (mm). The identification of specimens was made accordance to keys given by Jones *et al.*, [1]; Yamaguti [7] and relevant literature.

Results and Description

Family Eucotylidae Cohn, 1904

Genus *Paratanaisia* Freitas, 1959

Paratanaisia ishaquei n.sp.

Description

Body of the fluke is long, cylindrical, tapering at both ends, measuring 4.392–4.60 x 0.892–0.90 in size. Oral sucker muscular, terminal rounded in outline, measuring 0.25–0.26 x 0.267 in diameter. Prepharynx absent. Pharynx rounded overlapped by oral sucker, measuring 0.178 in diameter. Esophagus short, tubular, measuring 0.103–0.130 in length, diverticulate into intestinal caeca which run in lateral fields of body, extending posteriorly, forming a cycloid in front of posterior extremity.

Testes two, large, lung-shaped situated at mid-level of body. Right testis measuring 0.741–0.780 x 0.339–0.350 and left testis 0.660–0.692 x 0.339–0.380 in size. Ovary large, median, pretesticular in position, irregularly v-shaped, measuring 0.392–0.417 x 0.303–0.320 in size. Vitellaria composed of two unequal bands commencing from level of intestinal fork, running in lateral field of body; right band extended up to the post-testicular level, whereas left band extended up to mid-level of left testis. Post-testicular space measuring 1.946–2.120 in size. Uterus filling entire body of worm from level of intestinal fork up to posterior extremity filled with eggs which are small in size measuring 51–86 X 34–51.

Taxonomic summary

Type Host: Mallard *Anas platyrhynchos* (Anseriformes: Anatidae)

Type locality: Kambar Shahdaskot, Sindh, Pakistan

Site of infection: kidney

Number of specimen recovered: 13 from 27 hosts.

Etymology: Name of new species refers to Mohammad Ishaque, the late father of first author.

Discussion

Genus *Paratanaisia* Freitas, 1959 parasites of renal medullary collecting ducts and ureters, mostly of Columbiformes and Galliformes hosts and also of Anseriformes distributed in American Continent and Philippines (Maldonado, 1941)^[8], (Travassos *et al.*, 1969)^[2], (Mena *et al.*, 1986)^[9], (Fedynich *et al.*, 1996)^[3]. In Brazil, *Paratanaisia* is one of the most prevalent in domestic birds and has already been reported in kidney of the Pigeon *Columba livia*, Ruddy ground – dove *Columbina talpacoti*, domestic chicken *Gallus gallus domesticus*, the Guinea fowl *Numida meleagris*, the Turkey *Meleagris gallopavo*, and also of a wild galliform spot – winged wood quail *Odontophorus capoeira* (Travassos *et al.*, 1969; Costa *et al.*, 1975 Silva *et al.*, 1990 Menezes *et al.*, 2001 and Pinto *et al.*, 2004)^[2, 10, 11, 12, 13].

Species of Genus *Paratanaisia* includes *Paratanaisia bragai* Santos, 1934 collected from *Columba livia*, *Gallus domesticus*, *Meleagris gallopavo dom*, *Quiscalus q. aeneus*, *Limnothlypis swainsoni*, *Seiurus aurocapillus* of Puerto Rico of USA differs from present species in having smaller body size, pharynx oval, esophagus short, testes smaller irregular in shape, ovary smaller rounded in shape, vitellaria in two equal

bands, commencing from intestinal fork reaching up to third part of body and eggs larger in size (Yamaguti, 1971)^[7]. *Paratanaisia robusta* Freitas, 1951 (Yamaguti, 1971)^[7] collected from *Crypturellus tataupa* of Brazil differs in having smaller body, oral sucker smaller, pharynx short; esophagus indistinct; both testes smaller irregular in shape, ovary smaller star shaped, smaller in size; vitellaria in two equal bands and eggs smaller in size.

Paratanaisia ectorchis Fischthal and Kuntz, 1976^[4] collected from kidney of *Bambusicola thoracica sonorivox* of Taiwan differs from present species in having smaller body size, oral sucker ventro terminal, transversely elongated, pharynx smaller overlapping oral sucker, esophagus longer, testes smaller irregular in shape, ovary multi lobed and eggs smaller in size.

On the basis of size and shape of body, ovary and testes, distribution and position of Vitellaria and egg size, a new species *Paratanaisia ishaquei* n.sp. is proposed to accommodate the present worm. However, this genus is being reported for the first time from Pakistan and *Anas platyrhynchos* is new host record for the genus *Paratanaisia* Freitas, 1959. The name of new species refers to the Mohammad Ishaque, the late father of first author.

Psilochasmus oxyurus Luhe, 1909

Family Psilostomidae Loss, 1900

Genus *Psilochasmus* Luhe, 1909

Psilochasmus oxyurus Luhe, 1909

Description

Body of worm is muscular, elongated, with rounded anterior and tapering posterior end, measuring 3.0–4.484 X 0.695–0.878 in size. Forebody is 1.006–1.220 and hind body is 1.609–2.413 in size. Oral sucker is well developed, muscular, subterminal, almost rounded in shape, measuring 0.158–0.343 X 0.268–0.303 in size. Prepharynx short wider than long measuring 0.068–0.070 X 0.120–0.125 in size, opens into a pharynx which is oval in shape, smaller than oral sucker. Immediately after pharynx body becomes slightly narrower and then broadens at the level of acetabulum to attain maximum width. Esophagus is long, diverticulate into intestinal caeca which run in lateral sides of the body and end in between posterior testis and posterior extremity. Ventral sucker is well developed, highly muscular, cup-shaped and larger than oral sucker, measuring 0.378–0.728 X 0.728–0.745 in size.

Testes are tandem, median, contiguous, rounded to oval in shape; anterior testis measuring 0.317–0.457 X 0.195–0.203 and posterior testis 0.414–0.440 X 0.243–0.338 in size. Cirrus sac long, tubular in shape, measuring 1.016–1.050 X 0.203–0.225 in size. Vitellaria situated in lateral sides of body, commencing from posterior margins of ventral sucker reaching up to the post-testicular region, ending in between posterior testis and posterior end of the body, not confluent posteriorly. Ovary median, pre-testicular, rounded in shape, smaller than testes, measuring 0.158–0.186 in diameter. Distance between ovary and ventral sucker measuring 0.355–0.457 from ventral sucker, Post-testicular space is 0.451–0.661 in size. Eggs measuring 84–86 X 24–26 in size.

Taxonomic summary

Type Host: Mallard *Anas platyrhynchos* (Anseriformes: Anatidae)

Type locality: Kambar Shahdaskot, Sindh, Pakistan

Site of infection: intestine

Number of sp. recovered: 68 from 21 hosts.

Discussion

Present species resembles with *Psilochasmus oxyurus* (Creplin.,1825) Luhe, 1909 but differs in distribution of vitellaria which is situated in lateral sides of the body commencing from posterior margins of ventral sucker leading up to the post testicular region, not confluent posteriorly and

other minor characteristics. Previously this genus was reported by the Bhutta and Khan in 1975[14] from *Anas platyrhynchos* of Punjab, Pakistan. However, this genus is being reported for the first time from Sindh province and second time from Pakistan.

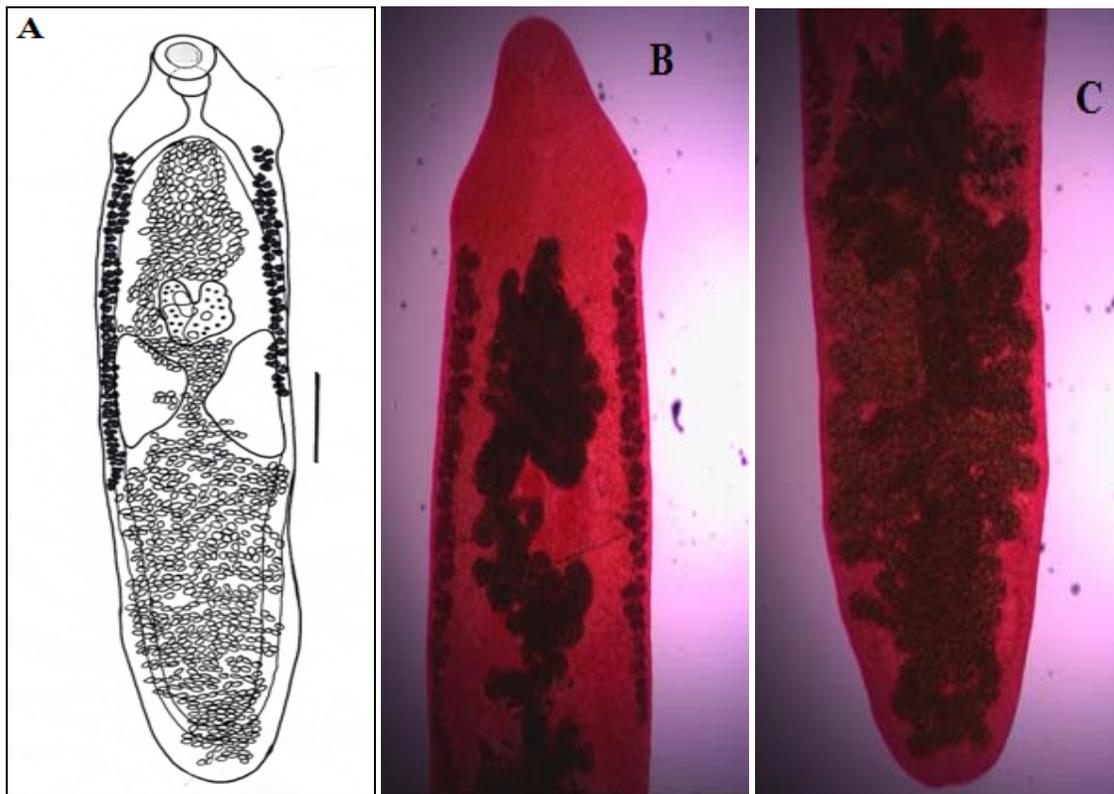


Fig 1: *Paratanaisia ishaquei* n. sp. (A) Entire worm; (B & C) Photographs of anterior and posterior parts of body. Scale bar: (a) 0.5mm.

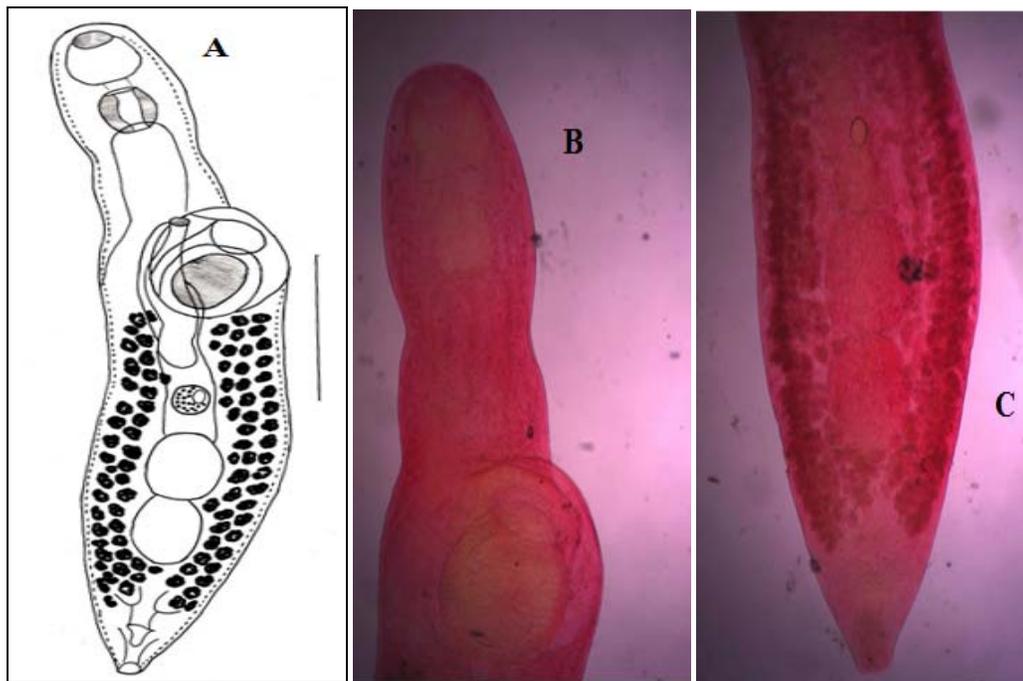


Fig 2: *Psilochasmus oxyurus* (A) Entire worm; (B & C) Photographs of anterior and posterior parts of body. Scale bar: (a) 1mm.

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