Short Communication

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NEW RECORD OF *DENDRITOBILHARZIA PULVERULENTA* (TREMATODA: SCHISTOSOMATIDAE) FROM PAKISTAN.

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ABSTRACT

During present studies on helminth parasites of black coot, *Fulica atra* (Gruiformes: Rallidae), in Sindh Province of Pakistan, twelve specimens (eight ♂ and four ♀) of *Dendritobilharzia pulverulenta* (Braun, 1901) Skrjabin, 1924 were collected from eleven hosts. Male *D. pulverulenta* were more frequent. This is first record of the genus *Dendritobilharzia* Skrjabin and Zakharow, 1920 from Pakistan.

Keywords: *Dendritobilharzia pulverulenta*, *Fulica atra*, Sindh, Pakistan.

INTRODUCTION

Studies on schistosomes in waterfowl are valuable not only from veterinarian viewpoint but also as a tool to predict the risk of human infection by the schistosome larval stages (cercariae) which develop in water snails. The infection, known as swimmer's itch or cercarial dermatitis, is considered to be an emerging disease in human. The association between avian schistosomes and cercarial dermatitis in humans has been recognized for a long time. The disease seems to be most prominently distributed along the major flyways of migratory birds transporting the parasites to and from wintering areas and thus spreading the infection in all water reservoirs in which susceptible intermediate hosts live (Kolářová *et al*., 2006).

Flukes of the family Schistosomatidae are peculiar in that they mature in the blood vascular system of their definitive hosts and are dioecious. Several species that cause serious diseases to humans and their domestic animals are included in this family (Gibson *et al*., 2002). Family Schistosomatidae was described by Poche (1907). Mehra (1940) proposed two subfamilies Dendritobilharziinae and Gigantobilharziinae. He also described *Dendritobilharzia asiaticus* in *Nettion crecca crecca* of Allahabad, India. Later on, Farley (1971) synonymized Dendritobilharziinae with Gigantobilharziinae. Ulmer and Vande Vusse (1970) reported *D. pulverulenta* (Braun, 1901) Skrjabin, 1924 in Anseriformes and presented some previously undescribed features including presence of Laurer's canal and prostate gland cells. They also reported hermaphroditism in males. Vande Vusse (1979) described host parasite relationship of *D. pulverulenta* and birds of the family Anatidae. Vande Vusse (1980) revised genus *Dendritobilharzia* Skrjabin et Zakharow, 1920 and specific diagnosis of *D. pulverulenta* (Braun, 1901) Skrjabin, 1924. He placed *D. asiatica* Mehra, 1940 as species inquirenda due to presence of only female worm. Rind (1989) reported *D. pulverulenta* (Braun, 1901) Skrjabin, 1924 in *Anas superciliosa*, *Anas rhynchotis*, *Cygnus atratus*, *Tadorna variegata* and *Aythya novaeseelandiae* with all new host records from New Zealand. He also listed avian hosts reported first time worldwide with *Dendritobilharzia* including *Anas superciliosa superciliosa*, *Anas rhynchotis variegata*, *Cygnus atratus*, *Aythya novaeseelandiae* and *Tadorna variegata*. Bayssade-Dufour *et al*. (2006) described *D. pulverulenta* (Braun, 1901) with improved species diagnosis confirmed with molecular analysis. Adult *Dendritobilharzia* species differ from other schistosomatids by having dendritic branches arising from common cecum and by inhibiting arterial system.

Fulica atra, a migratory game bird is popular food item in Sindh Province of Pakistan. Therefore, the interest was developed to investigate this bird for the presence of helminth parasites.

MATERIALS AND METHODS

Live 101 black coot, *Fulica atra* Linnaeus (Gruiformes: Rallidae), collected from different water bodies of Sindh Province, Pakistan were examined for helminth parasites. Hosts were dissected without care of the worms. Twelve specimens (eight ♂ and four ♀) were collected from the aortal parts connected with the lung, kidney, intestines and gizzard of eleven hosts. Worms were fixed under slight cover glass pressure in 70% ethanol, stained with borax carmine, dehydrated in graded series of ethanol, cleared in clove oil and xylol and mounted in Canada balsam. Diagrams were made with the help of a camera lucida. Photographs were taken with camera Olympus DP12. All measurements are given in micrometer (µm) unless otherwise stated, as holotype

is followed by range in parenthesis.

RESULTS

Family Schistosomatidae Poche, 1907

Subfamily Gigantobilharziinae Mehra, 1940

Genus *Dendritobilharzia* Skrjabin and Zakharow, 1920

***Dendritobilharzia pulverulenta* (Braun, 1901) Skrjabin, 1924** (Fig. 1–2)

DESCRIPTION: Body in both sexes is flat, leaf-like, tapering at both ends. Females larger than males. Tegument smooth without ornamental structures. Digestive tract starts from oral opening situated subterminally, leading into esophagus which is surrounded by esophageal glands. Esophagus bifurcates into intestinal crura at level of genital pore in males and at level of uterus in females, which reunites posteriorly running up to posterior end in zigzag lateral branches. In both sexes suckers not observed. Vitellaria commencing from level of union of intestinal crura up to hindbody.

***Male*:**

(Based on 8 specimens): Body 7.94 mm (4.62–7.94) long by 1.48 mm (0.77–1.48) wide. Oral opening sub terminal. Esophagus 460 (450–580) long, surrounded by esophageal glands at its distal part. Esophagus bifurcates into intestinal crura, which reunites posteriorly at a distance of 770 (610–880) from esophageal bifurcation. A high number of testes 80–100 not uniform in shape and arrangement, starting from union of intestinal crura up to posterior extremity of body. Seminal vesicle long. Cirrus well developed 350 (18–350) long by 230 (100–230) wide with bulbous distal end. Genital pore dextral at a distance of 630 (500–640) from anterior extremity.

***Female*:**

(Based on 4 specimens): Body 9.41 mm (5.85–9.48) long by 1.51 mm (1.08–1.52) wide. Digestive tract similar to males. Esophagus 270 (210–580) long. Intestinal crura reunite posteriorly at a distance of 2000 (1240–2000) from esophageal bifurcation running posteriorly in zigzag lateral branches. Ovary submedian, long, coiled within crura. Seminal receptacle median, immediately posterior to ovary, 170 (170–650) long by 70 (70–150) wide. Vitellaria in spaces between dendritic branches of gut. mehli's gland 300 (300–350) long by 360 (360–390) wide. Reproductive organs; ovary, oviduct, Mehlis' gland and uterus entirely intercaecal. Uterus filled with numerous eggs. Eggs 39–57 long by 31–47 wide.

Taxonomic summary

Type Host:	Black coot, *Fulica atra* (Gruiformes: Rallidae)
Site of infection:	Arterial system
Type locality:	Manchhar Lake ($26^0$24'N, $67^0$38'E), Sindh Province, Pakistan
Type specimens:	Holotype and Allotype are deposited at Department of Zoology, University of Sindh, Jamshoro, Pakistan.
Prevalence:	10.89%

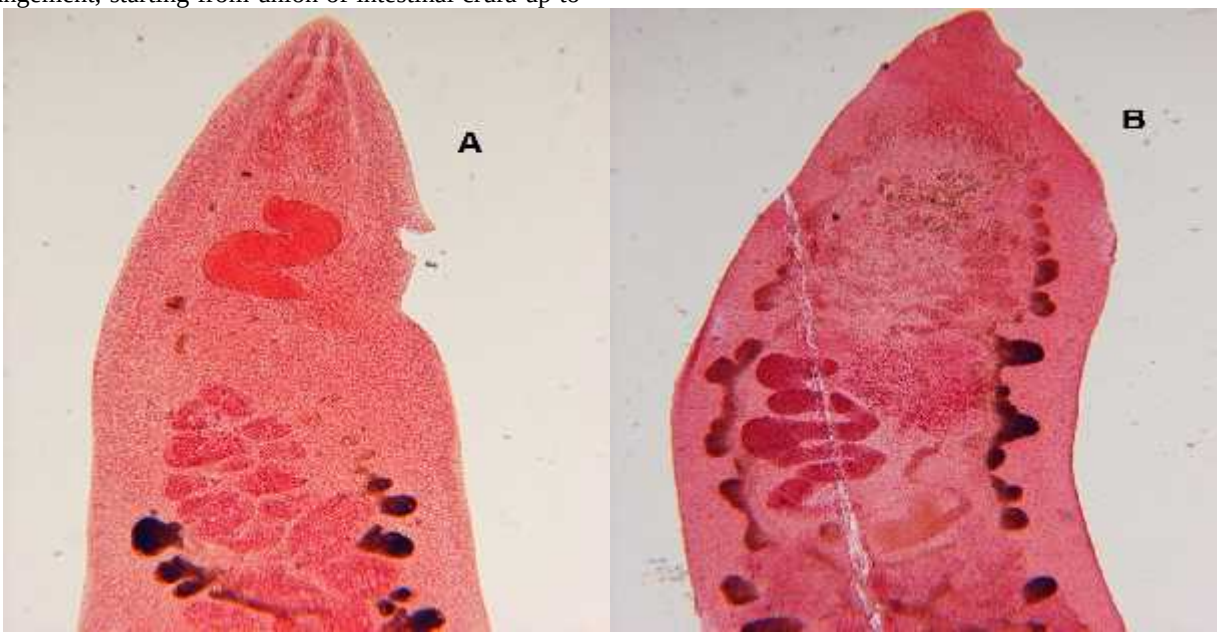
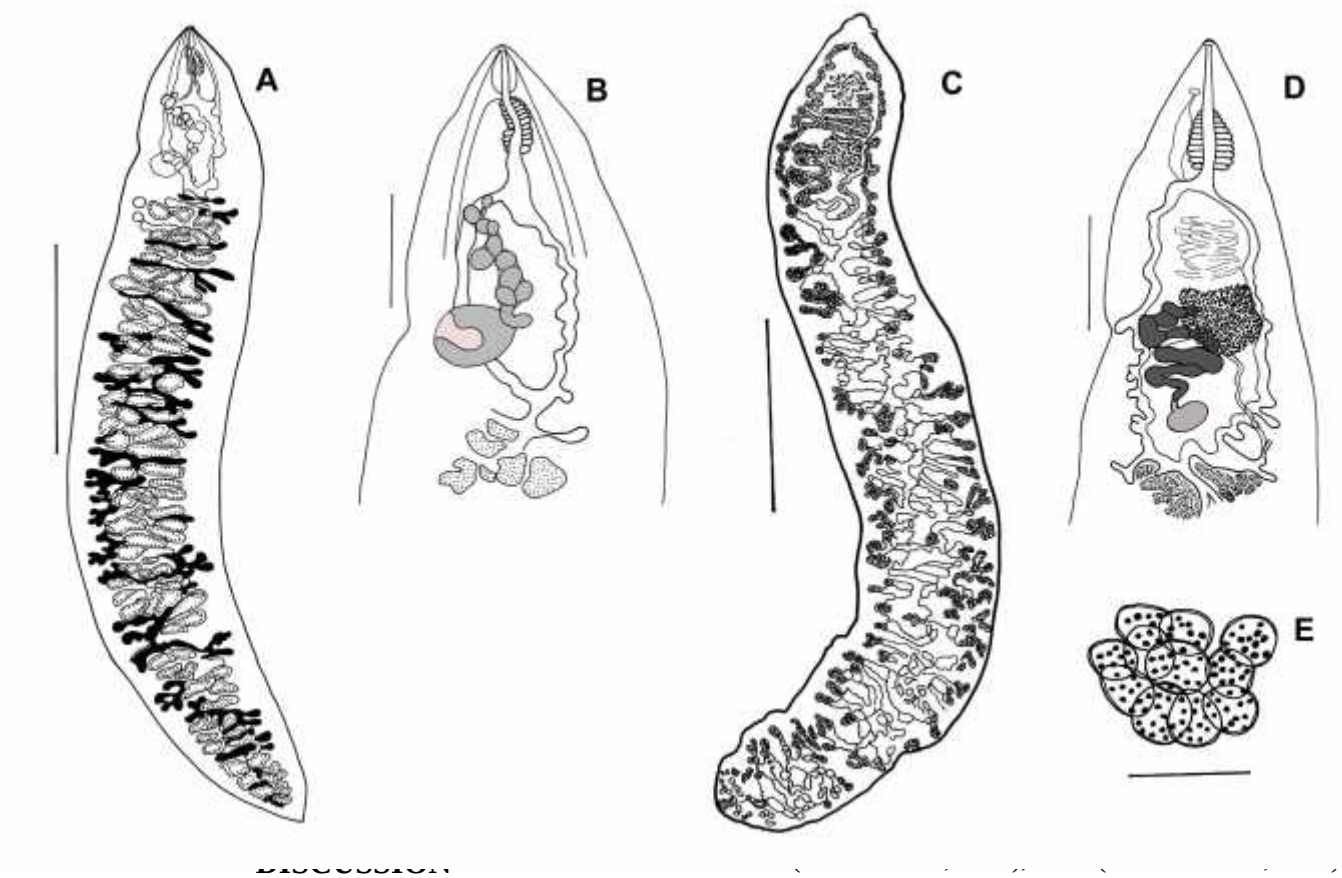


FIGURE 1. Photograph A & B of *Dendritobilharzia pulverulenta*.
A: Male anterior portion. B: Female anterior portion.



DISCUSSION

Schistosomes are considered to be highly pathogenic for migratory waterfowls (Kolářová *et al*., 2006). Genus *Dendritobilharzia* Skrjabin and Zakharow, 1920 was proposed to accommodate schistosomes from birds. Type species is *Dendritobilharzia pulverulenta* (Braun, 1901) Skrjabin, 1924 reported from the blood vessels of *Querquedula querquedula*, *Anas platyrhynchos*, *Fulica atra*, *Nyroca*, *Aythya fuligula* (Yamaguti, 1971). Other species include *D. asiatica* Mehra, 1940 in *Nettion crecca* from India; *D. anatinarum* Cheatum, 1941 in *Anas platyrhynchos* from New York and *D. loosi* Skrjabin, 1924 in *Pelecanus onocrotalus* from Russia.

Dendritobilharzia species have been reported from avian hosts including *Aix sponsa*, *Anas creca*, *Anas discors*, *Anas platyrhynchos*, *Anas querquedula*, *Anas rhynchotis*, *Anas superciliosa superciliosa*, *Aythya affinis*, *Aythya americana*, *Aythya ferina*, *Aythya novaeseelandiae*, *Bucephala albeola*, *Bucephala clangula*, *Cygnus olor*, *Cygnus atratus*, *Cygnus columbianus*, *Mergus merganser*, *Mergus serrator*, *Nettion crecca* and *Tadorna variegate* from Poland (Sulgostowska, 1972; Khalifa, 1976), New Zealand (Rind, 1989), North America (Ulmer and Vande Vusse, 1970), Brazil (Freitas and Costa, 1972), Czech Republic (Kalarova *et al*., 1989, 1997), Germany (Palm, 1965); and France (Bayssade-Dufour *et al*., 2006).

Previously there is no record of avian schistosome belonging to the genus *Dendritobilharzia* Skrjabin and Zakharow, 1920 form Pakistan. This report constitutes first record of the genus *Dendritobilharzia* Skrjabin and Zakharow, 1920 from Pakistan.

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