

***Echinostoma atrae*, New Species (Digenea: Echinostomatidae) in Black Coot *Fulica atra* (Aves: Rallidae) of Manchhar Lake, Sindh, Pakistan**

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Abstract. - *Echinostoma atrae*, new species (Digenea: Echinostomatidae) is described from intestine of the bird Black Coot *Fulica atra* of Manchhar Lake, Sindh, Pakistan. Although the present specimens resemble with type species *Echinostoma revolutum* but are distinguished from it in having aspinose body, 38 collar spines, absence of collar spines on oral sucker, more elongated and widely separated testes and tubular excretory bladder.

Keywords: Avian trematode, *Echinostoma atrae*, new species, Black Coot *Fulica atra*, Manchhar Lake.

INTRODUCTION

Trematode fauna of birds of different feeding habits are poorly known in Pakistan and reports published are only on the morphotaxonomy of parasites of birds (Dharejo, 2006).

The Black Coot *Fulica atra* is a migratory bird. This species is widely distributed in Europe and Asia. The helminth fauna of *Fulica atra* have been studied in different countries where the bird passes sometime in their migratory route (Kulisic *et al*, 2004; Foronda *et al*, 2003; Tanveer and Chishti, 2001; Gupta and Singh, 1985; Bhutta and Khan, 1975; Yamaguti, 1971; Gower, 1939). *Fulica atra* is a protected species in Pakistan and their populations are restricted to aquatic habitats. Examination of gut contents of the birds revealed that their diet consists of vegetable matter, mostly submerged weeds, annelid worms, fresh water gastropods, aquatic insects and small fish (Roberts, 1991). Black Coot is a palatable food of local people of Sindh province of Pakistan. Trematodes collected from the gut contents of Black Coot of Manchhar Lake are identified as *Echinostoma atrae* n.sp. are described here.

Manchhar Lake located at 26°24'N; 67°38'E is in District Jamshoro, about 300 kilometers north-west of Karachi in Khirthar valley on the international route of migratory birds.

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MATERIALS AND METHODS

41 live hosts were collected from Manchhar Lake and brought to the Parasitology laboratory of Zoology Department, University of Sindh, Jamshoro, Pakistan. After anesthetizing birds were dissected and examined for helminth parasites. During examination of gut contents and visceral organs, five mature specimens were collected from intestine. One specimen was damaged during the process. The specimens were fixed in AFA solution, flattened under slight cover glass pressure to prevent curling, stained with Borax carmine, dehydrated in graded series of ethanol, cleared in clove oil and xylol. The specimens were finally mounted permanently in Canada balsam for detailed study. Diagrams were made with camera lucida. Measurements are given in millimeter (mm) and those of eggs in micrometer (µm).

***Echinostoma atrae*, new species (Fig. 1)**

Host

Black Coot *Fulica atra* (Rallidae)

Site of infection

Intestine.

Locality and date

Manchhar Lake, Sindh, Pakistan; 07th
November 2005.

eggs. Scale bar: A & B, 2 mm; C, 0.5 mm; D, 1
µm.

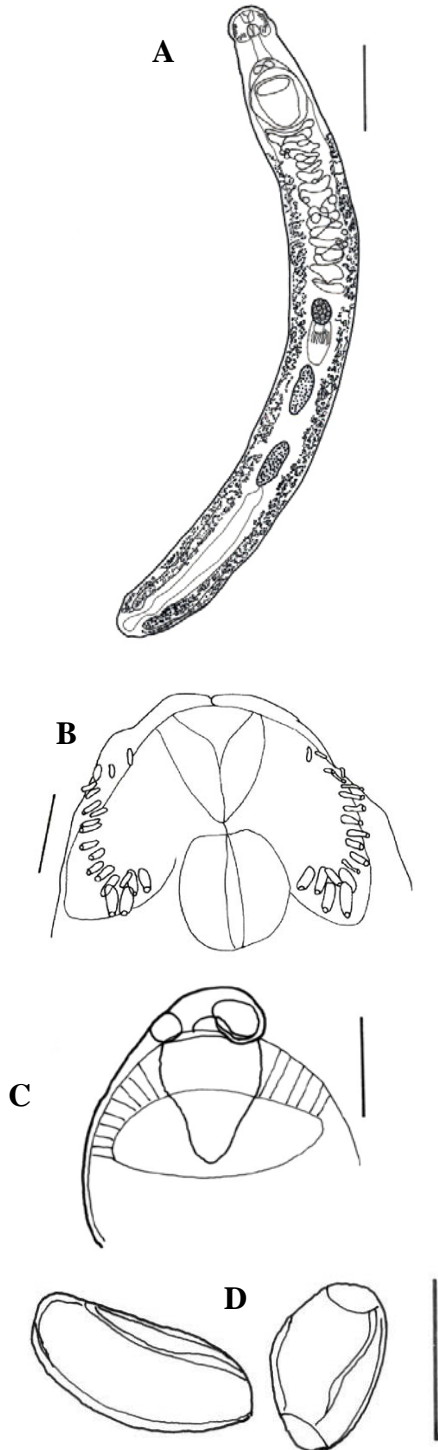


Fig. 1. *Echinostoma atrae*, new species; A, entire worm; B, head collar; C, cirrus sac; D,

Description

It is an elongated fluke, measuring 14.214-15.885 X 1.499-1.642 in size. Forebody, 1.285-1.514 and hindbody is 11.428-12.942 in length. Maximum width at second quarter of the body. Cuticle smooth, without spines or other ornamental structures. Head collar well developed, muscular 0.543-0.685 X 0.638-0.799 in size, bearing 38 collar spines with blunt ends in a single row. Six angle spines on each ventral lappet considerably larger than the marginal spines, 0.049-0.093 X 0.013-0.033 in size. Marginal spines measuring 0.022-0.074 X 0.005-0.024. Oral sucker well developed, muscular, subterminal, rounded 0.178-0.285 X 0.249-0.499 in diameter. Prepharynx hardly visible. Pharynx also muscular, rounded, 0.314-0.357 X 0.214-0.321 in diameter. Esophagus, 0.347-0.514 in length and bifurcating anterior to the acetabulum. Intestinal caeca simple, smooth extending up to the posterior extremity. Acetabulum muscular, much larger than oral sucker located in anterior quarter of the body measuring, 1.357-1.571 X 1.199-1.285 in size. Sucker width ratio is 1:2-4.8.

Testes elongate, tandem, widely separated, slightly intended, postovarian, intercecal and postequatorial. Anterior testis measuring 1.071-1.178 X 0.285-0.399, and posterior testis 0.999-1.142 X 0.285-0.371 in size. Distance between two testes is 0.464-0.785. Cirrus sac oval, lies between intestinal bifurcation and acetabulum, measuring 0.199 X 0.514 in size. Genital pore median, immediately postbifurcal, just anterior to acetabulum.

Ovary spherical, median and pretesticular, 0.499-0.571 X 0.428-0.464 in diameter. Uterine seminal receptacle post-ovarian, larger than ovary 0.928-1.057 X 0.357-0.499 in size. Uterus consists of numerous delicate transverse coils winding between ovary and acetabulum. Vitellaria extending from lower level of acetabulum up to posterior end of body. Eggs oval shaped, double-walled, 105-157 X 71-86 in size. Excretory bladder straight, extending from terminal excretory pore almost to the posterior testis.

DISCUSSION

The genus *Echinostoma* Rudolphi, 1809 was erected to accommodate trematodes from birds. Type specimen is *Echinostoma revolutum* (Froelich, 1802) Looss, 1899, syn. *E. echinatum* (Zeder, 1803); *E. armatum* Molin, 1858; *E. revolutum* var. *japonicum* Kurisu, 1932; *E. miyagawai* Ishii, 1932; *E. paraulum* Dietz, 1909, in various aquatic and terrestrial birds including Anatidae, Phalacrocoracidae, Scolopacidae, Ardeidae, Rallidae, Phasianidae, Corvidae, Columbidae, etc., occasionally in man - Looss, Tubangui, Sprehn, Yang, Beaver, Bashikirova, Yamaguti, etc; *E. miyagawai* and *E. echinatum* Looss (1899).

Other species have variable number of collar spines are reported in birds from various parts of the world including: Armenia, Australia, Azerbaidzhan, Brazil, Bulgaria, C. Asia, China, Cuba, Czechosl., Egypt, Estonia, Europe, Far East, Famosa, Gagarin, Georgia, Germany, Japan, Kirgizia, Kurova, London, Louisiana, Madagascar, Manitoba, N. and S. America, Queensland, Russia, Siberia, Tadzhikistan, Turkestan, Ural mountains, Uzbekistan, Venezuela (Yamaguti, 1971), India (Chishti and Ahmad, 1991) and Pakistan (Bhutta and Khan, 1975).

The present species (14.214-15.885) is larger in size than *E. revolutum* (4.0-22 X 0.88-2.5), *E. parcespinosum* (0.9-1.0 X -), *E. turdi* (1.0 X ¼), *E. koisarensis* (1.07-1.3 X 0.25-0.33), *E. fragosum* (2.1-3.12 X 0.3-0.33), *E. neglectum* (2.5-4.5 X 1.0), *E. nephrocystis* (2.5-4.5 X 1.0), *E. chasma* (2.58 X 0.64), *E. columbae* (2.63-7.65 X 0.85-1.53), *E. echinocephalum* (2.7-3.3 X 0.23-0.27), *E. ignavum* (2.8 X 0.6), *E. aliud* (2.9-6.3 X -), *E. stromi* (20 X 1.175), *E. dilatatum* (2-4 X 1.0), *E. crotophagae* (3.0-8.0 X 1.0-1.9), *E. bhattacharyai indicum* (3.12 X -), *E. americanum* (3.4 X 1.1), *E. asiaticum* (3.5-4.2 X 0.4-0.6), *E. hsui* (3.5-4.2 X 0.4-0.6), *E. barbosai* (3.648-7.823 X 0.456-0.958), *E. oxycephalum* (3-4 X 1/3-1), *E. equinatum gigas* (35-40 X 3-4), *E. goldi* (4.0-7.0 X 1.36), *E. azerbaijanicum* (4.5-4.8 X 0.8-1.2), *E. aphyllactum* (4.5-5.0 X 0.77-0.7784), *E. exechinatum* (4.5-6.0 X 4.436), *E. emollitum* (4.5-6.7 X 0.55-0.7), *E. ralli* (4.5-8.8 X 0.8-1.3), *E. govindum* (4.6-4.9 X 0.92),

E. mesotestius (4.75-8.32 X 0.99), *E. microrchis* (5.0 X 1.0), *E. revolutum tenuicolle* (5.12-8.0 X 1.8-2.0), *E. siticulosum* (5.5-7.5 X 0.7-0.94), *E. exile* (5.5-7.5 X 0.82-1.0), *E. caproni* (5.65 X 1.5), *E. bhattacharyai* (5.7 X 1.05), *E. stridulae* (5-10 X 0.92-1.25), *E. longicirrus* (5-7 X 0.9-1.2), *E. crecci* (5-8 X 1.0-1.25), *E. minimum* (5 X 0.9), *E. elongatum* (6.0-9.5 X 0.7-0.8), *E. pekinense* (6.29-6.73 X 1.04-1.23), *E. chloropodis* (6.4-6.68 X 1.0-1.2), *E. sudanense* (6.5 X 1.4), *E. nudicaudatum* (6.832-7.632 X 0.948-1.28), *E. uitalicum* (6.8-7.5 X 1.35-1.75), *E. audyi* (6-14.1 X 0.81.5), *E. mendax* (6-9.5 X 0.4-0.53), *E. condignum* (7.0-13.5 X 0.95-1.3), *E. erraticum* (7.0-8.8 X 1.45), *E. attenuatum* (7.222-11.222 X 0.885-1.593), *E. roussetoti* (7.3 X 1.5), *E. chloropodis cachinnans* (7.35-9.0 X 0.81-0.87), *E. chloropodis philippinense* (7.55-10 X 1.05-1.22), *E. stantschinskii caudatum* (7.6-7.9 X 0.9), *E. coronale* (71.1 X 2.28), *E. uralense* (8.5 X 1.0), *E. academicum* (8.5 X 1.2), *E. necopinum*, (8.5-15 X 1.5-1.72), *E. robustum* (8.8-9.8 X 1.33-2.18), *E. stantschinskii* (9.0-9.8 X 1.14-1.29), *E. multispinosum* (9.4 X 1.3), *E. travassosi* (9.48-9.68 X 2.12), *E. turkestanicum* (9.65-10.9 X 1.8-2.33), *E. transfretanum* (9-11 X -), *E. acuticauda* (9-12 X 0.9-1.0), *E. australe* (10.2 X 1.5), *E. uncatum* (10.5 X 1.98), *E. operosum* (10 X 1.4), *E. grande* (11.25 X 1.5), *E. corvi* (11.4 X 1.62), *E. alepidotum* (11.5 X 1.14), *E. coecale* (11.7 X 2.072), *E. annulatum* (12 X 1.0), *E. gracile* (12.0 X 1.2), *E. amurzeticum* (12.12-15.12 X 0.94-1.1), *E. kashmirensis* (13.04 X 1.55), *E. australasianum coromandum* (13.5 X 2.5), *E. anseris* (13.20.5 X 2.1-2.5), *E. australasianum* (13-14 X 1.75) and *E. armatum* (14 X 0.8).

While it is smaller in size than *E. hilliferum* (14.5-16 X 1.7-2.2), *E. uncinatum* (14.6 X 2.25), *E. sarcinum* (14-14.5 X 2.08-2.14), *E. bancrofti* (15.7 X 1.7), *E. paracoalium* (17.1 X 2.3), *E. dietzi* (19.107-21.23 X 1.69-1.89), *E. rufinae* (19.82 X 1.69), *E. miyagawai* (21-26 X 2.0-3.5) and *E. echinatum* (92-134 X 59-76).

Eggs of present species 105-157 X 71-86 are larger in size than *E. govindum* 47 X 23, *E. fragosum* 62.4 X 38.4, *E. exechinatum* 74-110 X 32-69, *E. asiaticum* 75 X 45, *E. hsui* 75 X 45, *E. kashmirensis* 75-119 X 54-64, *E. americanum* 80 X 54, *E. stantschinskii* 80 X 65, *E. australe* 80-100 X

60-70, *E. bancrofti* 80-110 X 50-60, *E. australasianum coromandum* 81-103 X 44-59, *E. azerbaijanicum* 83-108 X 48-72, *E. aphyactum* 84-87 X 48-50, *E. uncatum* 86.4-91.2 X 50.4-52.8, *E. multispinosum* 86-98 X 46-53, *E. sindhense* 87.5-105 X 62.5-70, *E. operosum* 88-93 X 60, *E. armatum* 90 X 60, *E. revolutum* 90-105 X 59-83, *E. anseris* 90-108 X 63-75, *E. amurzetium* 90-110 X 60-70, *E. attenuatum* 90-115 X 50-67, *E. grande* 90-95 X 50, *E. elongatum* 91-105 X 54-73, *E. bhattacharyai* 91-109 X 67-72, *E. mesotestis* 93 X 50, *E. siticulosum* 93.6-103.2 X 50.4-55, *E. revolutum tenuicolle* 94-115 X 55-64, *E. ignavum* 95-100 X 50, *E. sudanense* 95-105 X 55-60, *E. turkestanicum* 95-108 X 54-58, *E. chloropodis cachinnans* 95-108 X 65-72, *E. mendax* 96-100 X 57-62, *E. stantschinskii caudatum* 96-105 X 63-72, *E. nudicaudatum* 97-115 X 67-72, *E. condignum* 98.4-100.8 X 48-50.4, *E. audyi* 98-132 X 60-75, *E. chloropodis* 99 X 66 102-108.8 X 74.8-81.6, *E. uitalicum* 100 X 60-65, *E. emollitum* 100-105 X 52-56, *E. pekinense* 100-108 X 54-58, *E. chloropodis philippinense* 101-104 X 75, *E. crotophagae* 102 X 50, *E. alepidotum* 102-110.8 X 60-61.2, *E. necopinum* 103-108 X 52-57, *E. caproni* 105-120 X 50-60 and *E. australasianum* 105-126 X 65-77.

While these are smaller in size than *E. travassosi* 107-119 X 51-64, *E. rufinae* 108 X 58, *E. stridulae* 108.8-116 X 60-68, *E. coecale* 109 X 63-69, *E. crecci* 109.2-117.6 X 58-69, *E. ralli* 110-130 X 68-81, *E. robustum* 11-129 X 60-69, *E. goldi* 112 X 55, *E. gracile* 112 X 80, *E. acuticauda* 112-126 X 63-75, *E. aliud* 114-122 X 69-74, *E. paracoalium* 114-123 X 44-57, *E. corvi* 114-126 X 66-75, *E. sarcinum* 115.6-122.4 X 68-75, *E. transfretanum* 115.6-122.6 X 68-74.8, *E. minimum* 117-126 X 62-67, *E. academicum* 118 X 74, *E. stromi* 120-125 X 50-55, *E. hilliferum* 120-130 X 70-75, *E. dietzi* 122-64-71, *E. coronale* 125 X 57, *E. erraticum* 125-67.5, *E. uralense* 128 X 72 and *E. columbae* 130 X 70,

Among all these species of the genus *Echinostoma* Rudolphi, 1809, the present new species is close to the type species *E. revolutum* in body shape and uterine windings. The present new species differs from *E. revolutum* in having 38 collar spine and absence of collar spine on the oral sucker region. While these are 37 in *E. revolutum*

and are present on the oral sucker region. The present species also differs from the *E. revolutum* in having aspinose body, more elongate and widely separated testes and presence of tubular excretory bladder.

The present species also differs from *E. revolutum* recovered from the host *Anas platyrhynchos* from Pakistan (Bhutta and Khan, 1975) in having larger body length, shape of head collar, number of collar spines, number of angle spines, absence of collar spines on oral sucker region, widely separated testes, and larger eggs.

Due to morphological and morphometric differences between present and previously described species of the genus *Echinostoma* Rudolphi, 1809 the new species *Echinostoma atrae* is proposed. Name of the new species refers to species of the host.

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