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Microphallus magnagulletum n. sp. (Digenea: Microphallidae) from Black Coot, *Fulica atra* (Gruiformes: Rallidae) in Sindh province of Pakistan.

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Abstract: In result of ongoing research work on the helminth parasites of *Fulica atra* (Gruiformes: Rallidae) in Sind province of Pakistan, a total of 07 flukes of the genus *Microphallus* Ward, 1901 were recovered from the intestine. On the basis of characteristics like body shape and size, very expansive or broad esophagus, small irregularly lobed thick-walled intestineal ceca, shape and location of male and female genital organs like testes and ovary, measurement of oral sucker and ventral sucker and seminal vesicle V-shaped, a new species *Microphallus magnagulletum* is recommended. The new species name indicate to broader esophagus.

Keywords: Avian trematode, *Microphallus magnagulletum*, new species, *Fulica atra*, Sindh, Pakistan

1. INTRODUCTION

Sindh province with wonderful geography has always been regarded as an ideal habitat for aquatic and terrestrial birds and millions of migratory birds emigrate from Siberia during winter season every year. Freshwater bodies are favorable habitats for indigenous as well as migratory birds and most important rural fisheries resources, and have very important ecological effect on man and animal parasites. Migrant birds transport disease causing agents that might be transferred among other birds at breeding, wintering, and stopover habitations, where several birds of many species are concentrated (Jourdain *et al*., 2007). These habitations offer satisfactory settings for the breeding as well as growth of mollusks, crustaceans and insects which act as intermediate hosts for the completion of helminthic lifecycles. Such an environment therefore enhances the chances of acquiring parasitic infection in these birds (Gower, 1939). Wild birds might act as reservoir hosts for pathogenic microorganisms which harmfully distress the local avian hosts, chiefly which are raised commercially as a foodstuff source for the man (Nice, 1994). Evidences recommend that the birds are the transporter of infection producing agents including helminths and other microorganisms in human and other animals (Dhraejo, 2006).

Rports on trematode parasites in avian hosts of Pakistan include Begum, Ghazi and (Noor-Un-Nisa 1997), (Bilqees and Jehan 1971), (Bilqees and Khan 2006), (Bilqees and Jehan 1977), (Bilqees, *et al*., 2003), (Birmani *et al*., 2013a,b), (Birmani, *et al*., (2011a, b, c, 2009, 2008), (Channa *et al*., 2009), (Das and Ghazi 2010a, b), (Dharejo, *et al*., 2006, 2007 and 2009), (Dharejo, Birmani and Khan 2010a, b), (Farooq *et al*., 1996), (Ghazi *et al*., 2006), (Khan, *et al*., 1983 *et al*., 2008).

Fulica atra being seasonal travelling bird comes Pakistan from Siberia and other Russian states during winter from October to March each year, mostly existing in aquatic habitats of Sindh province and considered as a pleasant edible food by the common public of the province. Black coot is an omnivorous birds which feeds on the pondweeds, small invertebrates, seeds and wide range of small living prey comprising the eggs of other aquatic bird species (Roberts, 1991). *Fulica atra* is killed for the purpose of food by the fishermen of this area which is the main source of protein and income. *Fulica atra* is mostly found in natural freshwater habitats and man-made ponds throughout Pakistan. These environments provide satisfactory settings for the breeding as well as the growth of intermediate hosts. Therefore, the *Fulica atra* has fair possibilities of harboring helminthic infection from these habitats. Keeping in view above facts, it was therefore proposed to investigate *Fulica atra* in Sindh province of Pakistan

2. MATERIAL AND METHODS

During present research work, Black coot *Fulica atra* were collected from various aquatic habitats of the Sindh province. The host birds were carried to the parasitology laboratory of Department of Zoology, University of Sindh, Jamshoro, Sindh, Pakistan. Hosts were anesthetized with chloroform and dissected under stereo dissecting microscope. Throughout the inspection alimentary canal and different visceral organs, 07

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trematodes of the genus *Microphallus* Ward, 1901 were recovered from the intestine of the 02 host birds. These trematodes were fixed in the AFA (alcohol-formalin-acetic acid) solution. Trematodes were stained with Borax carmine, further dehydrated in ordered alcohol series. Specimens were cleared in the clove oil and xylene. Finally the trematodes were mounted permanently in the Canada balsam for detailed microscopical study. Illustrations are drawn with the aid of camera Lucida and photograph are taken with the Olympus DP-12 digital camera microscope. Measurements of different organs are given in millimeter (mm) and of eggs in micrometer (µm).

3. RESULTS

***Microphallus magnagulletum* n. sp. (Fig. 1-3)**

Type host:	Black coot, *Fulica atra* (Gruiformes: Rallidae)
Site of infection	Intestine
No. of specimens recovered:	07 from 02 hosts
Type locality:	Manchar Lake (26º24'N 67º38'E), Bubak City, Sindh Province, Pakistan
Etymology	Specific name refers to very broad esophagus

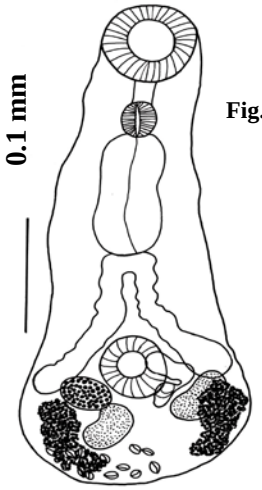


Fig. 1



Fig. 2

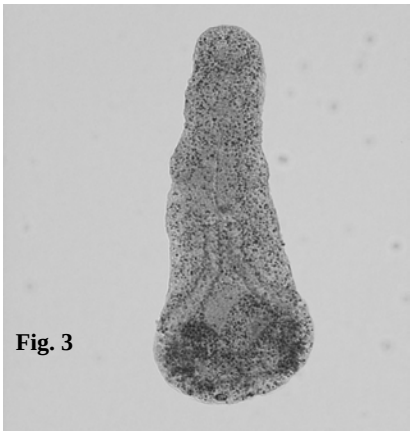


Fig. 3

Fig. 1-3. *Microphallus magnagulletum* n. sp.

Body very small, muscular, claviform, 0.408-0.425 long. Cuticle devoid of spines but minutely pitted in such a manner as to present microscopically rough surface. Forebody, 0.262-0.291 long by 0.088-0.141 wide, hindbody, 0.077-0.1 long by 0.152-0.183 wide. Oral sucker almost round, 0.041-0.066 long by 0.040-0.076 wide. Prepharynx short, 0.016-0.023 long by 0.008-0.015 wide. Pharynx muscular, round-oval, 0.025-0.031 long by 0.025-0.027 wide. Esophagus very broad, 0.097-0.105 long by 0.047-0.054 wide fork into intestinal ceca at the distance of 0.047-0.055 from ventral sucker. Intestinal ceca very short, thick-walled, irregular in outline, diverticule in lateral fields of body where they end near posterior level of acetabulum or anterior end of testes, sharing edge with ovary and left testes. Ventral sucker smaller in size than the oral sucker, situated in the posterior third of the body, 0.045-0.055 long by 0.048-0.052 wide.

Testes bean-shaped, oblique, forming triangle with acetabulum. Right testes posterolateral to ventral sucker, sharing cephalic portion with ovary, 0.037-0.051 long by 0.019-0.027 wide. Left testes submedian, overlapped by ceca and vitellaria, 0.031-0.044 long by 0.013-0.029 wide. Seminal vesicle "V" shaped, 0.033-0.063 long by 0.013-0.016 wide.

Ovary oval shaped situated in front of left testis and left postero-lateral side of the ventral sucker, sharing edges with right cecum and right testes, 0.025-0.042 long by 0.022-0.026 wide. Vitellarium situated in hindbody covering the lateral sides from postacetabular level terminating up to the posterior end of the body. Uterus filled with few eggs which are oval in shape, double-walled, 13-16 long by 5-9 wide.

4. DISCUSSION

Genus *Microphallus* Ward, 1901 was erected to accommodate trematodes from birds (Bray *et al*., 2008 and Yamaguti, 1971). Type species of the genus is *Microphallus* (*Spelophallus*) *primas* (Jägerskiold, 1908) Stunkard, 1958 in aquatic crab-eating birds (Anseriformes) of North and Western Europe.

M. sabanensis Díaz, Bashirullah and Hernández, 2004 collected form experimentally infected host *Cairina moschat*a of Venezuela differs from present species in having pyriform body, spinose tegument, esophagus having same length as intestinal ceca, symmetrical testes, ovary anterolateral to ventral sucker and vitellaria composed of large follicles.

M. bilobatus Cable, Connor and Balling, 1960 collected from the host *Charadrius marginatus* of Namibia, Southern Africa differs from the current species in varing shape and body size, male and female

gonads greater in size than the ventral sucker, larger prepharynx, very thin and longer esophagus, bean-shaped ovary sharing edges with ventral sucker, pear-shaped testes and larger distance between ceca and gonads.

Present specimens have close resemblance with *M. nicolli* and *M. tasmaniae* but *M. nicolli* differ in having larger body size, thin esophagus, smaller testes and ovary and smaller oral sucker than ventral sucker. *M. tasmaniae* differs from present specimens in having larger body size, larger prepharynx, smaller oral and ventral suckers and in seminal vesicle shape.

On the basis of aforementioned diagnostic differences between present and previously known species like; body size, broader esophagus, shorter irregularly lobed, thick-walled ceca, position size and shape of male and female gonads, oral sucker and ventral sucker size and V-shaped seminal vesicle, a new species *Microphallus magnagulletum* is proposed. The name of new species refers to very broader esophagus.

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