

## Original Article

### Description of first record of *Petasiger exaeretus* Dietz, 1909 (Trematoda: Echinostomatidae) in avian host from Pakistan.

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#### Abstract

The aim of present paper is to describe first record of genus *Petasiger* which was collected during systematic study of helminths of Little Cormorant, *Phalacrocorax niger* of District Sanghar, Sindh, Pakistan. *Petasiger exaeretus* (Dietz, 1909) were identified from the intestine of Little Cormorant, *Phalacrocorax niger* on the basis of morphological features including pear shaped body, maximum width at testicular level, 27 head collar spines, long fore-body, well developed pharynx, pre-acetabular cirrus sac, tandem and contiguous testes, short uterus, spherical and pre-testicular ovary. *P. exaeretus* is a common parasitic species of Cormorants. However, it has not been reported from Pakistan in Little Cormorant, *Phalacrocorax niger* prior to the present study.

**Keywords:** *Petasiger exaeretus*, *Phalacrocorax niger*, new record, Sindh, Pakistan.

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## INTRODUCTION

Genus *Petasiger* (Dietz, 1909) belongs to the family Echinostomatidae (Loss, 1899) and reported from many avian species including *Ardeacinerea*, *A. cocoi*, *Antigone*, *Podiceps australis*, *P. poliocephalus*, *P. podiceps*, *P. rufficollisjaponicus*, *P. cristatus*, *P. fluviatilis*, *P. grisegena*, *P. dominicus*, *P. minor*, *P. major*, *Anas platyrhynchos*, *Gavia stellate*, *Podilymbus podiceps*, *Casarca ferruginea*, *Puffinus*, *Colymbusnigricollis*, *C. caspicus*, *C. grisegena*, *C. cristatus*, *C. auritus*, *C. nigricans*, *Pedetaithyagrisegena*, *Nyrocanyroca*, *Dendrocygna javanica*, *Gallinula chloropus*, *Iarus ichthyæetus*, *Anhinga melanogaster*, *A. ruffa*, *Tachybaptus dominicus*, *Rollandia rolland*, *Coragyps atratus*, *Pelecanus occidentalis*, *Phalacrocorax carbo*, *P. pygmaeus*, *P. melanoleucus*, *P. sulcirostris*, *P. africanus*, *P. niger*, *P. capitalus* and *Columba livia*. Examinations of these birds have revealed 33 species of genus *Petasiger*. Out of them 19 are valid species (Abdel-Malek, 1953; Bisseru, 1957; Yamaguti, 1971; Nasicova, 1994;

Faltynkova *et al.*, 2008; Lunaschi and Drago, 2010; Pinto *et al.*, 2013). Moreover, no species of genus *Petasiger* was described from present locality. Therefore, this paper is intended for describing first record of above discussed genus and enlisting its cosmopolitan distribution. Although Little Cormorant *Phalacrocorax niger* is examined in Pakistan for presence of helminths by Akram (1996), Dharejo *et al.* (2010) and Abro *et al.* (2016a, b, c, d, e, f, g). However, genus *Petasiger* was not reported. Present study was focused to ascertain the presence or absence of *Petasiger* in Little Cormorant of Sanghar district, Pakistan.

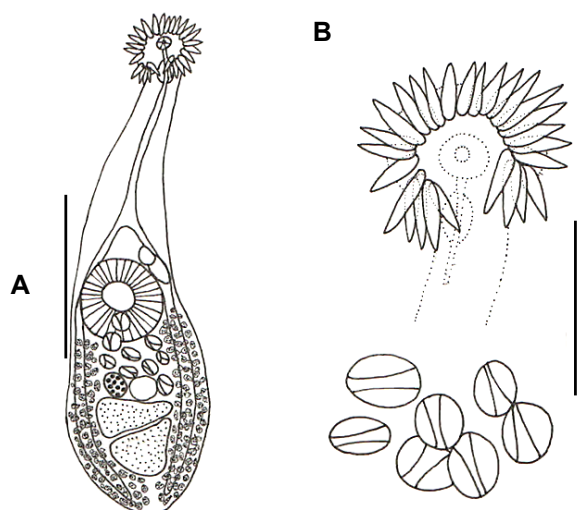
## MATERIALS AND METHODS

Little Cormorants (n=11) were captured alive with trapping net during December 2015 from district Sanghar of Sindh province, which coordinates at 25.8577°N and 69.4785°E. These were brought to the Parasitology Laboratory of Zoology Department, University of Sindh, Jamshoro. They were necrotized through method described by Dharejo (2006) and

Birmani (2011). Trematodes of genus *Petasiger* were collected from intestine of Little Cormorant *Phalacrocorax niger* and fixed in 70% alcohol, stained in borax carmine, dehydrated in ethanol, cleared in clove oil and xylene and mounted in Canada balsam. Mounted slides were kept in oven at 50°C to 55°C for overnight. Photographs and drawing lines were made with camera Lucida and Nikon Digital camera. Millimeter (mm) scale was used for measurements. The specimens were identified with the help of identification keys (Yamaguti, 1971; Jones *et al.*, 2005) and relevant research papers (Faltynkova *et al.*, 2008; Lunaschi and Drago, 2010; Pinto *et al.*, 2013). The host was identified with help of literature (Ali and Ripley, 1978; Roberts, 1991; Sarker and Naher, 2002; Chozyhiyattel, 2009).

## RESULTS

Little Cormorants (n= 11) were examined to ascertain the presence or absence of *Petasiger* and 04 (36.36%) were found positive.



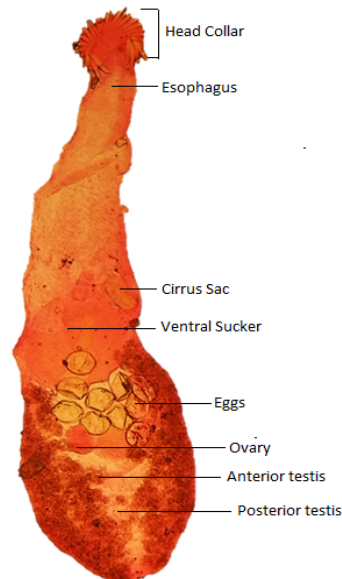
**Figure 1: *Petasiger exaeretis*, A: Entire worm B: Head collar and C: Eggs (Scale bar: A. 0.5 mm; B&C 0.2 mm).**

**Family Echinostomatidae Loss, 1899**  
**Subfamily Echinostomatinae Loss, 1899**  
**Genus *Petasiger* Dietz, 1909**  
***Petasiger exaeretis* Dietz, 1909 (Fig. 1-2)**

### Description

Body of trematodes recorded from the intestine of *Phalacrocorax nigeris* small, pear shaped with maximum width at testicular level,

measuring 1.35-1.46 mm long and 0.33-0.44 mm wide. Fore-body elongated. Head collar well developed, reniform, measuring 0.155-0.166 mm in length and 0.177-0.188 mm in width, armed with double row of 27 spines, including 05 corner spines on each side and 17 marginal spines. Corner spines are 0.077-0.089 mm larger than marginal spines, which measure 0.065-0.089 mm in length. Spines mostly pointed but few are truncated or broken. Oral sucker is small spherical, sub-terminal, 0.044-0.048 mm in diameter.



**Figure 2: *Petasiger exaeretis***

Pre-pharynx present, pharynx well developed measuring 0.05-0.07 mm long, esophagus 0.35-0.44 mm long, bifurcated into ceca in front of ventral sucker. Ceca are 0.71-0.81 mm long and terminating at posterior extremity. Ventral sucker almost spherical 0.245-0.255 mm long and 0.265-0.272 mm wide, situated in post-equatorial region. Cirrus sac almost pre-acetabular, 0.11-0.122 mm long and 0.055-0.066 mm wide. Testes median, tandem, contiguous, located in fourth quarter of body. Anterior testis 0.10-0.11 mm long and 0.212-0.233 mm wide. Posterior testis 0.14-0.155 mm in length and 0.211-0.233 mm in width. Anterior testis is 0.12-0.199 mm and far from ventral sucker. Post-testicular area small, measuring 0.121-0.129 mm in length. Ovary oval, situated in front of anterior testes, shares edges with it, measuring 0.015-0.016 mm in length and 0.06-0.07 mm in width. Mehli's gland compact, larger than ovary, situated in parallel with ovary. Uterus short, containing few large eggs, measuring 0.044-0.057 mm in length and 0.053-0.085 mm

in width. Vitellaria lateral in position extended up to ventral sucker, non-confluent posteriorly.

found positive:  
 Site of infection: Intestine  
 Locality: Sanghar, Sindh, Pakistan  
*Phalacrocorax niger*, Little  
 Host: Cormorant  
 Record: New locality

**Taxonomic Summary:**

No. of specimens recovered: 73  
 No. of hosts: 04

**Table I: Comparison of various species of genus *Petasiger* with present form**

Name of organ	<i>Petasiger exaeretus</i> Present study	<i>P. exaeretus</i> (Dietz, 1909)	<i>P. phalacrocoracis</i> (Yamaguti, 1939)	<i>P. variospinosus</i> (Odhner, 1910) Yamaguti, 1933)
<b>Body</b>	Pear shaped 1.35-1.46 X 0.33-0.44	Pear shaped 2.53-3.52	Elongated 1.44-2.34 X 0.18-0.24	Elongated 1.56-3.77 X 0.36 -0.62
<b>Head collar</b>	0.155-0.166 X 0.177- 0.188	0.309-0.378	-----	0.187-0.266 X 0.280- 0.359
<b>No. spines</b>	27	27	27	27
<b>Corner spines</b>	0.048-0.077	0.080-0.125	0.043-0.078	0.086-0.110
<b>Marginal spines</b>	0.069 -0.089			0.062-0.093
<b>Oral sucker</b>	Sub-terminal, 0.044 -0.048X 0.044- 0.048	Sub-terminal 0.112- 0.145 X 0.100-0.150	Sub-terminal 0.065- 0.105 X 0.052-0.087	Sub-terminal 0.093- 0.156 X 0.076 -0.124
<b>Ventral sucker</b>	0.245-0.255 X 0.265- 0.277	0.277-0.344 X 0.283- 0.384	0.160-0.227 X 0.139- 0.202	0.343-0.468 X 0.358 - 0.421
<b>Esophagus</b>	0.35-0.44	-----	-----	0.442
<b>Prepharynx</b>	Present	Absent	Present	Present
<b>Pharynx</b>	Ovoid 0.05-0.077	0.130-0.185 X 0.088- 0.126	0.097 X 0.080	0.097 X 0.080
<b>Ceca</b>	Pre-acetabular to posterior extremity	Pre-acetabular to posterior extremity	Pre-acetabular to posterior extremity	Pre-acetabular to posterior extremity
<b>Testis</b>	Tandem, ovoid, located in 4 <sup>th</sup> quarter of body	Tandem, ovoid, located in 4 <sup>th</sup> quarter of body	Tandem, ovoid, located in 3 <sup>rd</sup> quarter of body	Tandem, ovoid, located in 2 <sup>nd</sup> quarter of body
<b>Anterior testis</b>	0.10-0.111 X 0.212- 0.233-	0.158-0.224 X 0.247- 0.496	0.138-0.284 X 0.176- 0.340	0.078-0.140 X 0.093- 0.110
<b>Posterior testis</b>	0.145-0.155 X 0.211- 0.233	0.221-0.320 X 0.284- 0.416	0.145-0.315 X 0.176- 0.353	0.62-0.110. X 0.93- 0.125
<b>Ovary</b>	0.015-0.016 X 0.06- 0.07	0.126-0.160 X 0.126- 0.160	0.095-0.132 X 0.76- 0.126	0.098-0.156 X 0.98 - 0.150
<b>Vitellaria</b>	Extended to lower edge of acetabulum	Extended above acetabulum	Extended to lower edge of acetabulum	Extended to lower edge of acetabulum
<b>Eggs</b>	0.057-0.085 X 0.0448-0.053	0.095-0.105 X 0.053- 0.065	0.086-0.095 X 0.050- 0.063	-----
<b>No. eggs</b>	9-12	31-33	1-6	-----
<b>Host</b>	<i>Phalacrocorax niger</i>	<i>P. carbo</i>	<i>P. carbo</i>	<i>P. niger</i>
<b>Location</b>	Intestine	Intestine	Intestine	Intestine
<b>Locality</b>	Sanghar Sindh	Czeck Republic	Czeck Republic	India

**DISCUSSION**

Genus *Petasiger* was first named by Dietz, 1909. Members of this genus are common parasites of fish eating birds and few other birds.

It is reported from Europe, Asia, America, Africa and Australia. *Petasiger exaeretus* Dietz, 1909 is type species of this genus. It is commonly found in birds of family Phalacrocoracidae. Furthermore, genus *Petasiger* is cosmopolitan

intestinal Echinostome consisting of many species (Yamaguti, 1971, Zamparo *et al.*, 2005 Faltynkova *et al.*, 2008, Lunaschi and Drago, 2010; Pinto *et al.*, 2013). Faltynkova *et al.* (2008) considered *P. caribbensis*, *P. novemdecim* and *P. tientsinensis* and *P. baschkirovi* as synonymous of *P. exaeretus*. Present specimens of *Petasiger* share certain morphological similarities and dissimilarities with *P. exaeretus*, *P. phalacrocoracis* and *P. variospinosus*. Its pear shaped body resembles *P. exaeretus*, whereas, *P. variospinosus* and *P. phalacrocoracis* have elongated body. Size of recorded trematode is smaller than *P. exaeretus*. It is somehow close to *P. exaeretus* that was described by Dietz (1910) from the same host. Size of trematode recorded during present investigation is close to *P. phalacrocoracis* and *P. variospinosus*. Oral sucker is sub-terminal in all compared species. Size of oral sucker of present trematode is smaller than *P. exaeretus*, *P. phalacrocoracis* and *P. variospinosus*. Ventral sucker in present species is almost post-equatorial as in *P. exaeretus*. Ventral sucker is pre-equatorial in *P. phalacrocoracis* and *P. variospinosus*. Size of ventral sucker of present species is relatively close to size of ventral sucker in *P. exaeretus*. Present trematodes have 27 spines on head collar and same numbers of spines are present in *P. exaeretus*, *P. phalacrocoracis* and *P. variospinosus*.

Present trematodes have five corner spines while *P. exaeretus*, *P. phalacrocoracis* and *P. variospinosus* have four corner spines. Size of corner spines of present trematodes is similar to the corner spines of the *P. phalacrocoracis* but differ from *P. exaeretus* and *P. variospinosus*. Testes are tandem, contiguous and almost ovoid in all compared species with variation in size but position of testes is same in present species and *P. exaeretus*, which are located in 4<sup>th</sup> quarter of the body, whereas, in *P. phalacrocoracis*, these are found in 3<sup>rd</sup> quarter of body and in *P. variospinosus* located in 2<sup>nd</sup> third of body. Vitellarium in present trematode is distributed near to lower edge of ventral sucker and same is in *P. phalacrocoracis* and *P. variospinosus*, whereas, *P. exaeretus* has pre-acetabular. In addition to above, the post-testicular area of present specimens and *P. exaeretus* is smaller and *P. phalacrocoracis* and *P. variospinosus* have large post-testicular space. Moreover, vitellaria not confluent posteriorly in all compared species. Present trematodes are

different from *P. exaeretus* in having slightly smaller size, number of corner spines and number of eggs in uterus but it agrees major generic feature including number of head collar spines, pear shaped body, long fore-body, post-equatorial testes, short uterus, distribution of vitellaria, extent of post-testicular area of *P. exaeretus*.

The species recorded during present study differs from *P. phalacrocoracis* in having pear shaped body, slightly smaller in size, location of ventral sucker, position of testes, smaller post-testicular area, smaller head collar and number of corner spines. It is also different from *P. variospinosus* in having pear shaped slightly smaller body, location of ventral sucker, position of testes and ovary and smaller post-testicular area (Table I). However, present trematodes closely resemble with *P. exaeretus* with slight variations. These differences can be attributed to host ecology and geography. It is first time recorded from *Phalacrocorax niger* in Pakistan. Genus *Petasiger* is also reported for the first time from Pakistan.

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