

## Research Article

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# New record of genus *Pallisentis* Van Cleave, 1928 (Acanthocephalan: Quadrigyridae) in Little Cormorant, *Phalacrocorax niger* (Aves: Phalacrocoracidae) from Sindh, Pakistan

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### Abstract

Helminth Parasites of Little Cormorant, *Phalacrocorax niger* from central District Sanghar of Sindh Pakistan were investigated during December 2014-2015. Little Cormorant, *P. niger* is fish eating, migratory cum resident bird, harbour diverse parasites and commonly found in water bodies of the study area. Eleven hosts (*P. niger*) were examined in Parasitological Laboratory of Zoology department, Sindh University Jamshoro. Only one host was harbouring two specimens of acanthocephalan. These were collected from intestine and have proboscis with four circles of spines, eleven circle of collar spine with 14 spines in each circle, sacculate proboscis receptacle, tubular lemenisci, cylindrical testes and long cement glands. These features correspond to generic features of genus *Pallisentis* Van Cleave, 1928. However, genus *Pallisentis* usually collected from freshwater fishes and has not been reported from birds. Therefore, present infection in Little Cormorant might be result of its piscivorous feeding habit. Present paper deals first record of genus *Pallisentis* Van Cleave, 1928 in Little Cormorant, *P. niger* from Pakistan.

**Keywords:** Acanthocephalan; Little Cormorant; *Phalacrocorax niger*; *Pallisentis*; Intestine

### Introduction

Pakistan is an important habitat and destination for resident as well as migratory birds. She has diverse geography and variety of ecosystems which attract the large birds'

population. The different seasons and favourable climate of this region favour avifauna to live and reproduce. Over 560 species of birds are reported in Pakistan [1]. Sindh province is one of such important

places for avifauna in Pakistan. District Sanghar is one of important districts of Sindh which hosts more than 136 species of avifauna including non-passerine and passerine. Sanghar also hosts large population of Little Cormorant (*P. niger*) [1] which was selected for helminthic study. Little Cormorant is aquatic and fish eating bird [2] and usually live in fresh water inlands, lakes, and coastal areas. It is voracious piscivorous consequently badly affecting commercial and recreational fishing. Cormorants have the potential to significantly damage fish stock and affect fish quality. It also produce impacts on aquaculture seriously even some time ruin it [3]. In Sanghar District freshwater lakes, canals, water reservoir are the favourable habitats for the Little Cormorant *P. niger*. These water bodies are used for culturing fishes. Thus, the host under study (*P. niger*) has reasonable chances to acquire infection from fishes.

Acanthocephalans in avian hosts generally and Little Cormorant (*P. niger*) especially are not well known in Pakistan. There is dire need of considerable and comprehension study on it. A few scholars have tested their stamina to study Avian Acanthocephalan including Khan and Bilqees, [4], Khan et al. [5, 7, 8], Bilqees and Khan, [9], Bilqees et al. [10], Khan et al. [11], Muti-ur-Rehman et al. [12, 13], Khan, [14] and Birmani et al. [15]. But none of them studied Acanthocephalan of Little Cormorant (*P. niger*). Purpose of present paper is to report first record of genus *pallisentis* from Little Cormorant (*P. niger*). However, four species of genus *pallisentis* including *P. kalriai* Khan et Bilqees [16], *P. magnum* Saeed et Bilqees, [17], *P. munifi* Naqvi et al. [18] and *P. sindhensis* Khan et Bilqees, [19] already reported from different species of fishes. The present specimen is first record of genus *Pallisentis* from avian host, particularly in Little Cormorant from

Pakistan (Table 1). Moreover, Little Cormorant (*P. niger*) studied by Akram, [20], Dharejo et al. [21] and Abro et al. [22-28]. They recorded *Contracaecun bubakii*, *Nigerina*, *Clinostomum complanatum*, *Clinostomum awadhi*, *Macrobilharzia macrobilharzia*, *Paryphostomum sanghari*, *Paryphostomum radiatum*, *Pseudapatemon* and *Euclinostomum heterostomum* in Pakistan.

### Materials and methods

Little Cormorant, *P. niger* (n=11) were captured alive from different water bodies of Sanghar District of Sindh Pakistan. These were transported to Parasitological Laboratory of Zoology department, Sindh University Jamshoro. The hosts were anesthetized and dissected ethically. The alimentary canal from esophagus to cloaca was removed from each host and scraped carefully for the presence of helminth parasites. The contents of sample were examined under binocular stereomicroscope. Two acanthocephalan specimens were recovered from intestine of one host. They were washed in normal saline and passed in graded alcohol series and fixed in 70% alcohol. The thick specimens were pressed in between plain slides and tied with thread and kept for overnight in 70% alcohol. After pressing, the threads were untied on next day. Fixed acanthocephalans were stained with Borax Carmine for 5 to 20 minutes depending upon the size and thickness of the specimen. After that, they were washed twice in 70% alcohol to remove excess stain and transferred into 90% and 100% alcohol subsequently for 5 to 20 minutes. Later on, specimens were transferred into clove oil for shining. Then specimens were cleared in xylene about five minutes. Finally specimens were mounted in Canada Balsam for detailed study. The mounted specimens were transferred in oven at 50 °C to 55 °C for overnight.

## Results

Eleven hosts were dissected and only one was infected with two acanthocephalan parasites (9.1%). The description is given below.

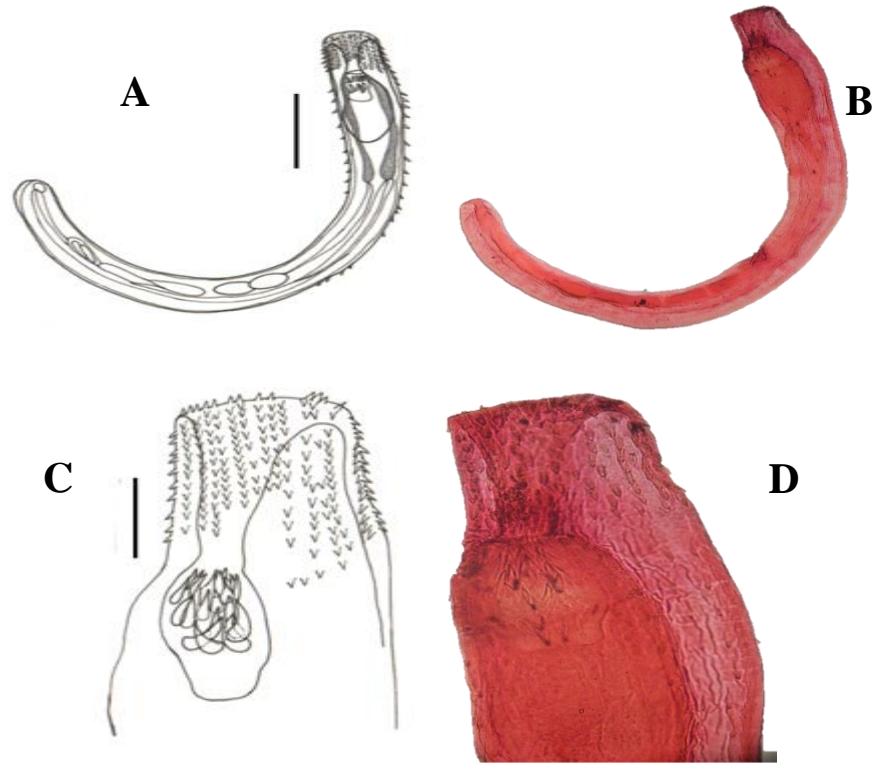
## Description

Body of the acanthocephalan is cylindrical measuring 3.45 in length, 0.32 in width and maximum wide at collar region (Figure A and B). Proboscis is prominent, well developed, globular, invaginated inside the trunk (Figure C and D) and measuring 0.22 long and 0.145 wide, equipped with 4 circles of fine recurred hooks, 8-10 hooks in each circle, hooks are same in shape but vary in size. Hooks of first circles are strong, large and consisted of well developed root and sharp blade, measuring 0.093-0.106 in length. Neck is prominent measuring 0.22 in

length and without hooks. Proboscis receptacle is sac or bag like, muscular, measuring 0.50 in length and 0.191 in width. Lemnsci tubular, equal in size, larger than proboscis receptacle. Both lemnsci are 0.808 long and 0.058 wide. Body consists of collar and trunk spines. Collar spines are arranged in eleven circles, each circle contains 14 spines. Posterior to collar is unspined region, which is followed by almost 21 rings of spines remaining part is devoid of spines. Anterior testis is 0.205 long and 0.088 wide. A posterior testis is 0.235 long and 0.088 wide. Seminal vesicle is 0.514 long and 0.058 wide. Cement glands are 2-3, well developed, cylindrical and measuring 0.22 long 0.102 wide. Cement gland and cement reservoir joins bursa. Saeftigen pouch is present and elongated in shape.

## Taxonomic status of *Palliesntis* spp. (Figure A-D)

<b>Family</b>	Quadrigyridae
<b>Genus</b>	<i>Palliesntis</i> Van Cleave, 1928 Syn. <i>Farzandia</i> Thapar, 1931 <i>Neosentis</i> Van Cleave, 1928
<b>Host</b>	Little Cormorant, <i>Phalacrocorax niger</i>
<b>No. of specimens recovered</b>	02
<b>No. of hosts found positive</b>	01 out of 11
<b>Site of infection</b>	Intestine
<b>Locality</b>	Sanghar, Sindh, Pakistan
<b>Record</b>	New host record



**Figure. A and B entire *Pallisentis* Sp. C and D anterior end of worm. Scale Bar: A. 0.5 mm and C. 0.1 mm**

#### Discussion

Genus *Pallisentis* was proposed by Van Cleave, 1928 with *Pallisentis umbellatus* Van Cleave, 1928 as type species. It is commonly reported from freshwater fishes especially *Ophicephalus argus*, *Siniperca* sp; *Cobitis decemcirrosus* and *Parasilurus asotus* (Table 1) [29]. Many species of genus *Pallisentis* are reported from various hosts and localities (Table 1), on the basis of Proboscis with four circles of 8-10 spines, eleven circles of collar spines with 14 spines in each circle, sacculate proboscis receptacle, tubular lemenisci, cylindrical testes, long cement gland and saefftigen pouch. Specimens collected during present study resemble generic features of *Pallisentis* as described in description. Therefore, these are identified as genus *Pallisentis*. However, its species level identification cannot be confirmed correctly due less number of specimens and recovered

specimen have invaginated proboscis, which misled exact counting of circle and number of spines. Moreover, from literature survey it was noted that, this genus of acanthocephalan usually collected from fresh water fishes. Present recovery from *Phalacrocorax niger* is unusual and may be accidental. Therefore, authors collectively decided to not go for species level identification. Furthermore, Little Cormorant, *Phalacrocorax niger* host is voracious piscivorous and probably it has acquired infection by eating fishes. Present study has recorded only two male specimens from intestine of single host. These specimens were found along with trematodes and were not embedded in the tissue of intestine. It is seen that acanthocephalan strictly attached with host tissue. Therefore, accidental acquiring of infection may not be ruled out completely. Moreover, genus *Pallisentis* has wide variation within species and sometime

procedure of fixing may cause deviation in structure of diagnostic features. Therefore describing present specimen up to species level needed sufficient collection of male as well as female. Therefore, present specimen

is identified up to generic level and genus is recorded for the first time from Little Cormorant, *P. niger* in Pakistan (Table 1). Present report establishes a new host record for genus *Pallisentis*.

**Table 1. Name of species of genus *pallisentis* along with host and locality**

S.No	Name of species	Host	Locality	References
1	<i>Pallisentis allahabdi</i> Agrawal, 1958	<i>Ophiocephalus marulius</i> (Pisces)	India	Bhattacharya, [30] Agrawal, [31]
2	<i>P. basiri</i> Farooqi, 1958	<i>Rhynchobdella aculeate</i> (Pisces)	India	Bhattacharya, [30] Farooqi, [32]
3	<i>P. buckeyi</i> Tadross, 1966	Unidentified fish (Pisces)	India	Bhattacharya, [30] Tadross, [33]
4	<i>P. channai</i> Gupta et al., 2015	<i>Channa punctatus</i> (Pisces)	India	Gupta et al. [34]
5	<i>P. cleatus</i> Van Cleave, 1928	<i>Monopterus javanensis</i> (Pisces)	China	Yamaguti, [29]
6	<i>P. clupei</i> Gupta and Gupta, 1979	<i>Clupea longiceps</i> (Pisces)	India	Bhattacharya, [30] Gupta [35]
7	<i>P. colisai</i> Sarkar, 1956	<i>Channa punctatus</i> (Pisces)	India	Bhattacharya, [30] Sarkar, [36]
8	<i>P. fotedari</i> Gupta and Sinha, 1991	<i>Clupea longiceps</i> (Pisces)	India	Bhattacharya, [30] Gupta and Sinha, [37]
9	<i>P. garuai</i> Sahay et al., 1971	<i>Clupisoma garua</i> (Pisces)	India	Bhattacharya, [30] Sahay et al. [38]
10	<i>P. guntei</i> Sahay et al., 1967	<i>Lepidocephalichthys guntea</i> (Pisces)	India	Bhattacharya, [27] Sahay et al. [39]
11	<i>P. guptai</i> Gupta and Fatima, 1985	<i>Nandas nandas</i> (Pisces)	India	Bhattacharya, [30] Gupta and Fatima, [40]
12	<i>P. jagani</i> Koul et al., 1991	<i>Channa channa</i> (Pisces)	Jammu Kashmir	Bhattacharya, [30] Koul et al. [41]
13	<i>P. kalriai</i> Khan et Bilqees, 1985	<i>Labeo rohita</i> (Pisces)	Pakistan	Khan et Bilqees, [16]
14	<i>P. magnum</i> Saeed et Bilqees, 1971	<i>Wallago attu</i> (Pisces)	Pakistan	Saeed et Bilqees, [17]
15	<i>P. mehrai</i> Gupta and Fatima, 1985	<i>Caranx kalla</i> (Pisces)	India	Bhattacharya, [30] Gupta and Fatima, [40]
16	<i>P. munifi</i> Naqvi et al., 2015	<i>Cirrhinus mrigala</i> (Pisces)	Pakistan	Naqvi et al. [18]
17	<i>P. nagpurensis</i> Bhalerao, 1931	<i>Ophiocephalus striatus</i> (Pisces)	India	Bhattacharya, [30] Bhalerao, [42]
18	<i>P. nandai</i> Sarkar, 1953	<i>Nandas nandas</i> (Pisces)	India	Bhattacharya, [30] Sarkar [43]
19	<i>P. ophicephali</i> Thapar, 1930	<i>Channa marulius</i> (Pisces)	India	Bhattacharya, [30] Thapar, [44]
20	<i>P. pandei</i> Rai, 1967	<i>Channa punctatus</i> (Pisces)	India	Bhattacharya, [30] Rai, [45]
21	<i>P. punctati</i> Gupta et al., 2015	<i>Channa punctatus</i> (Pisces)	India	Gupta et al. [46]
22	<i>P. sindhensis</i> Khan et Bilqees 1987	Fishes (Pisces)	Pakistan	Khan et Bilqees, [19]
23	<i>P. umbellatus</i> Van Cleave, 1928	<i>Ophiocephalus argus</i> (Pisces)	China	Yamaguti, [29]
24	<i>P. vinodai</i>	<i>Channa punctatus</i> (Pisces)	India	Gupta et al. [34]
25	<i>Pallisentis</i> sp.	<i>Phalacrocorax niger</i> (Aves)	Pakistan	Present study

## Conclusion

Genus *Pallisentis* recorded for the first time from avian host Little Cormorant, *Phalacrocorax niger*. Present report will help to understand diversity of acanthocephalan in avian fauna of Pakistan.

## Authors' contributions

Conceived and designed the experiments: MM Abro & AM Dharejo, Performed the experiments: MM Abro & NA Birmani, Analyzed the data: MM Khan, Wrote the paper: MM Abro & NA Birmani.

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