

Some Helminth Parasites of Gharial from Chitwan National Park, Nepal

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Abstract

A study on helminth parasites on captive gharial (*Gavialis gangeticus*) was conducted during July-December 2012 at Gharial Breeding Centre, Kasara, Chitwan National Park to isolate, identify and find out their prevalence. Dead gharial hatchlings were collected directly from the centre in fresh and frozen conditions. Out of 85 samples examined, 40 samples 47.06% as prevalence rate of helminth parasites. During the study three helminth parasites were first reported from the gharials of Nepal; Pentastomid (*Sebekia* sp.), Capillarioids and Ascaridoids. The dead hatchlings were found to be infected with Pentastomid (41.17%), Ascaridoids (7.05%), Capillarioids (1.17%), *Proctocaecum gairhei* (3.52%) and *Exotidendrium* sp. (36.47%). In the month of December helminth parasites showed highest prevalence; *Sebekia* sp. (100%) and *Proctocaecum gairhei* (75%) and *Exotidendrium* sp. (100%) and the lowest prevalence in the month of July; *Sebekia* sp. (4%), Capillarioids (4%) and *Exotidendrium* sp. (8%).

Key words: gharial, helminth parasites, pentastomid, Chitwan National Park

Introduction

The gharial (*Gavialis gangeticus*) is a large fresh water crocodylian and only the surviving species belonging to the subfamily Gavialinae. It is found in Northern Indian subcontinent in river drainages of India, Pakistan and Nepal. Gharials have elongated and narrow snout and jaws, which are provided with many interlocking, sharp and razor like teeth. The body is provided with highly developed laterally flattened tail with webbed rear feet for swift movement in fast flowing water habitat. Their ventral scales are provided with highly developed sensory pits. The sexual dimorphism is distinct. The male has bulbous growth on the tip of snout while it is absent in female.

Gharials at captive breeding centre have very high mortality rate. Their major helminth parasites so far known are *Dujardiascaris woodlandi*, *Gedoelestascaris gavialidis*, *Multicaecum agile*, *Typhlophorus lamellaris*, *Micropleura vivipara*, *Crocodylicola*

gavialis, *Exotidendrium* sp., *Harmotrema* sp., *Neodiplostomum gavialis*, *Proctocaecum dorsale*, *Proctocaecum gairhei*, *Subtriquetra megacephala* and *Subtriquetra shipleyi* (Sprent 1977, Linstow 1906, Narain 1930, Junker & Boomker 2006).

Gharial conservation began in Nepal with the help of Frankfurt Zoological Society which involves collection of wild eggs and is bred in the breeding center. The juveniles are released in different rivers of Nepal. The hatchlings are only fed with small sized fishes of different species and no such types of medicines are provided to them against any kind of diseases.

So, due to the lack of medicines and properly treated fishes they are prone to various types of helminthic infections which cause serious pathological as well as physiological disorders to them. So, helminthic infections can negatively affect the gharials at captive form and it demands for regular and systematic parasitological research.

Methodology

From July to December of 2012, a total 85 dead gharial hatchlings were collected from Gharial Breeding Centre, Chitwan National Park (27°20'32" - 27°41'23" north latitudes and 83°50'23" - 84°46'25" east longitude) on the permission Department of National Park and Wildlife Conservation (DNPWC) of Nepal and the above centre. The samples were kept in sterile plastic bags and were transported to the nearest veterinary lab camped at Buffer Zone nearby Sauraha, Chitwan. The samples were dissected as described by Huchzermeyer (2003). The abdominal cavity was inspected thoroughly and various visceral organs were exposed and kept in separate watch glasses containing normal saline. Various parts of intestinal scraps were observed under microscope. Lungs and liver were teased for the presence of helminthes. Similarly, the fecal samples were also tested using both sedimentation techniques and floatation methods. The measurements of eggs were taken in micrometer and photographs were taken through microscope. The helminthes were preserved in 70% ethanol for further identifications by making permanent slides.

The nematodes were kept in lacto phenol for half an hour and mounted in glycerine. Thus permanent slide were prepared.

The trematodes were pressed between large sized cover slip and tied with rubber band and were left in

alcohol formalin acetic acid solution for 24 hours. The fixed trematodes were gently removed and washed in distilled water. Then the trematodes were run in alcohol series and permanent slides were prepared. After 70% alcohol series they were stained with Gower's stain and finally mounted over DPX.

The pentastomid were directly observed under microscope after simple staining with Gower's stain and permanent slide were also prepared following similar method as followed for trematodes. The specimens have been deposited in helminthological collection of Tribhuvan University, Central Department of Zoology, Kirtipur, Kathmandu.

Results and Discussion

Out of 85 samples examined 40 samples were found to be positive contributing 47.06% as overall prevalence of helminthic infections. Out of the total helminth parasites recovered from different body parts, five types of helminthes were identified and remaining two helminths were left unidentified. Among the identified helminths, *Sebekia* sp. (41.17%) and *Exotidendrium* sp. (36.47%) were the highest prevalent ones followed by Ascaridoids (7.05%), *Proctocaecum gairhei* (3.52%) and finally the Capillarioids (1.17%) infecting the captive gharial hatchlings at the Gharial Breeding Center, Kasara, Chitwan National park (Table1).

Table 1. General prevalence of helminth parasites in gharials

S.N.	Endoparasites	Frequency (percentage) (n=85)
1	<i>Sebekia</i> sp.	35(41.17%)
2	Nematodes	
	a. Ascaridoids	6(7.05%)
	b. Capillarioids	1(1.17%)
3	Trematodes	
	a. <i>Proctocaecum gairhei</i>	3(3.52%)
	b. <i>Exotidendrium</i> sp.	31(36.47%)

During the study periods from July to December, *Exotidendrium* sp. (8%) showed highest prevalence and *Sebekia* sp. (4%) and Capillarioids (4%) showed equal prevalence rate in the month of July. In August, *Sebekia* sp. (40.74%) showed highest prevalence and then *Exotidendrium* sp. (33.33%) followed by Ascaridoid (11.11%). Similarly, *Sebekia* sp. (57.14%)

showed highest prevalence then Ascaridoids (14.28%) followed by *Exotidendrium* sp. In October, *Sebekia* sp. (70%) and *Exotidendrium* sp. (70%) showed equal prevalence rate followed by Ascaridoids (20%). In November and December, *Sebekia* sp. showed highest prevalence 80% and 100% respectively followed by *Exotidendrium* sp. 60% and 100% respectively (Table2).

Table 2. Monthwise prevalence of helminth parasites of gharials

S.N.	Endoparasites	Months					
		Jul(n=25)	Aug(n=27)	Sept(n=14)	Oct(n=10)	Nov(n=5)	Dec(n=4)
1	<i>Sebekia</i> sp.	1(4%)	11(40.74%)	8(57.14%)	7(70%)	4(80%)	4(100%)
2	Nematodes						
	a. Ascaridoids	0(0%)	3(11.11%)	2(14.28%)	2(20%)	0(0%)	1(25%)
	b. Capillarioids	1(4%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
3	Trematodes						
	a. <i>Proctocaecum gairhei</i> .	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	3(75%)
	b. <i>Exotidendrium</i> sp.	2(8%)	9(33.33%)	6(42.85%)	7(70%)	3(60%)	4(100%)

In the age groups 25-29 weeks, both highest and equal prevalence (100%) were shown by *Sebekia* sp. and *Exotidendrium* sp. Similarly, in the age group 17-21 week again both *Sebekia* sp. and *Exotidendrium* sp.

showed equal prevalence rate (70%). However, no any parasitic infections (0%) were observed in the age group 1-5 weeks (Table 3).

Table 3. Age wise prevalence of helminth parasites in gharials

Age groups(Weeks)	<i>Sebekia</i> sp.	Nematodes		Trematodes	
		Ascaridoids	Capillarioids	<i>Proctocaecum gairhei</i>	<i>Exotidendrium</i> sp
1-5(n=4)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
5-9(n=24)	1(4.16%)	0(0%)	1(4.16%)	0(0%)	2(8.33)
9-13(n=26)	12(46.15%)	3(11.53%)	0(0%)	0(0%)	11(42.30%)
13-17(n=12)	7(58.33%)	0(0%)	0(0%)	0(0%)	4(33.33%)
17-21(n=10)	7(70%)	2(20%)	0(0%)	0(0%)	7(70%)
21-25(n=5)	4(80%)	0(0%)	0(0%)	0(0%)	3(60%)
25-29(n=4)	4(100%)	1(25%)	0(0%)	3(75%)	4(100%)

The overall prevalence of helminthes parasites in the present study was found to be 47.06% which is very greater (17.36%) than the previous study (Gairhe 2007). This is the first report belonging to pentastomid parasite on gharials from Nepal. The pentastomid was identified as *Sebekia* sp. belonging to the family Sebekidae. The two new nematodes belonging to the family Ascarididae (7.05%) and family Capillaridae (1.17%) were also reported from this study. The capillarioids were identified by the presence of characteristic egg with elongated polar poles. No such reports on capillarioid in gharial were found earlier from Nepal. *Crocodilicapillaria longiovata* is the only gastric capillarioid and *Paratrichosoma* spp. are the skin capillarioids reported earlier (Ladds *et al.* 1995). However, they have no such serious path physiological effects on crocodiles. Similarly, the genus of Ascaridoids could not be confirmed because of the loss of its major portion during the exposure of intestine. The prevalence of *Proctocaecum gairhei* (5.84%) was found higher than the prevalence (3.52%) reported previously. Although, the trematode *P. gairhei*

is not directly associated with gharial mortality they are responsible for enlargement and shortening of the duodenum and the gross thickening of the mucosa at the opening of the bile duct into the duodenum. Similarly, *Exotidendrium* sp. (36.47%) was observed in the present study which is responsible for the pathological condition "Sphincter cap" in gharials. The pathological condition is characterized by a distinct whitish, blackish, yellowish and yellowish green or greenish granulomatous scab formed around colorectal orifice of the gharial hatchlings (Gairhe 2007). The two trematodes could not be identified.

Most of the helminths; Pentastomids, *P. gairhei*, *Exotidendrium* sp. and Ascaridoid requires the intermediate host that is fish. So fish is the major source of helminthic infection. The gharials at the breeding center at Chitwan National Park are commonly fed with the fishes belonging to the families: Cyprinidae; *Aspidopariamorar* (commonly called Chepua), *Barilius* spp. (commonly called chepua), *Labeo* spp. (commonly called rohu), *Bariliusbendelisis* var. *chedra*

(commonly called motia), *Hypothalalmichtys* spp. (commonly called silver carp) and *Puntius* spp. (commonly called sidhre) and family: Cichlidae; *Tilapia* spp. (commonly called tilapia). So, helminths infection in gharial hatchlings can be controlled by providing proper cold treated fishes and by giving them suitable antihelminthics.

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