A PRELIMINARY STUDY OF PARASITIC INFECTIONS OF SOME FISHES FROM KINABATANGAN RIVER, SANDAKAN, SABAH.

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ABSTRACT. *A survey of fishes of the Kinabatangan River was conducted to determine the fish types, abundance and prevalence of parasitic infection. The fishes were collected with gill nets in two distinct areas, named Abai and Bilit. Eleven fish species in ten genera and ten families were encountered. The family Ariidae formed 36.3% of the total number of individuals (n=80) while the rest were Pangasiidae (15%), Siluridae (11.3%), Cyprinidae (10%), Engraulidae (7.5%), Bagridae (6.3%), Toxotidae (6.3%), Sciaenidae (3.8%), Megalopidae (2.5%) and Clariidae (1.3%). Both ectoparasites and endoparasites especially intestinal helminth were recorded. The ectoparasite infestation rate was 45% whereas the endoparasite remain only 17.5%. The overall parasitic infection rate was more than half of sample (53.8%).This preliminary data indicated that almost half of the population of fishes from these areas could be exposed to parasitic infection.*

KEYWORDS: Infection, Parasites, Fishes, Kinabatangan River.

INTRODUCTION

Fishes are important to humans as a source of protein, but also they may perform as a vector of some human pathogens. Hence, one of the scientific importances of identifying a fish properly is to tell to some reliable extent the health condition of the fish, and certain parasitic infections present with some symptoms that bear on the external treatment of the fish. All species of fish are vulnerable to various parasitic infections depending on the species of fish and the type of stream inhabited.

In Sabah, although there are a few reports from the Kinabatangan river (such as Lee *et al.*, 2006; Lim & Wong, 1994), there are still some streams and rivers that have not been investigated. Therefore, this study is designed to determine the different kinds of fish found in Kinabatangan River, particularly from Abai and Bilit areas, by giving them morphological description and attempt a preliminary investigation of the parasitic infections of fish in this river.

Fish parasites have been studied extensively during the last few decades but information concerning biodiversity and host-parasite relationships still scarce. This type of information is poorly studied in Sabah in particular and in Borneo in general, and therefore, become the general targets of this study by focusing the fish types, abundance and prevalence of parasitic infection.

MATERIALS AND METHODS

The Kinabatangan River (Sungai Kinabatangan) is located in Sabah, East Malaysia on the island of Borneo with the coordinates of 5.7000ºN-118.3833ºE (see Figure 1 below). It is the second longest river in Malaysia, with the length of 560 kilometers from its headwaters in the mountains of southwest Sabah, to its outlet at the Sulu Sea, east of Sandakan.

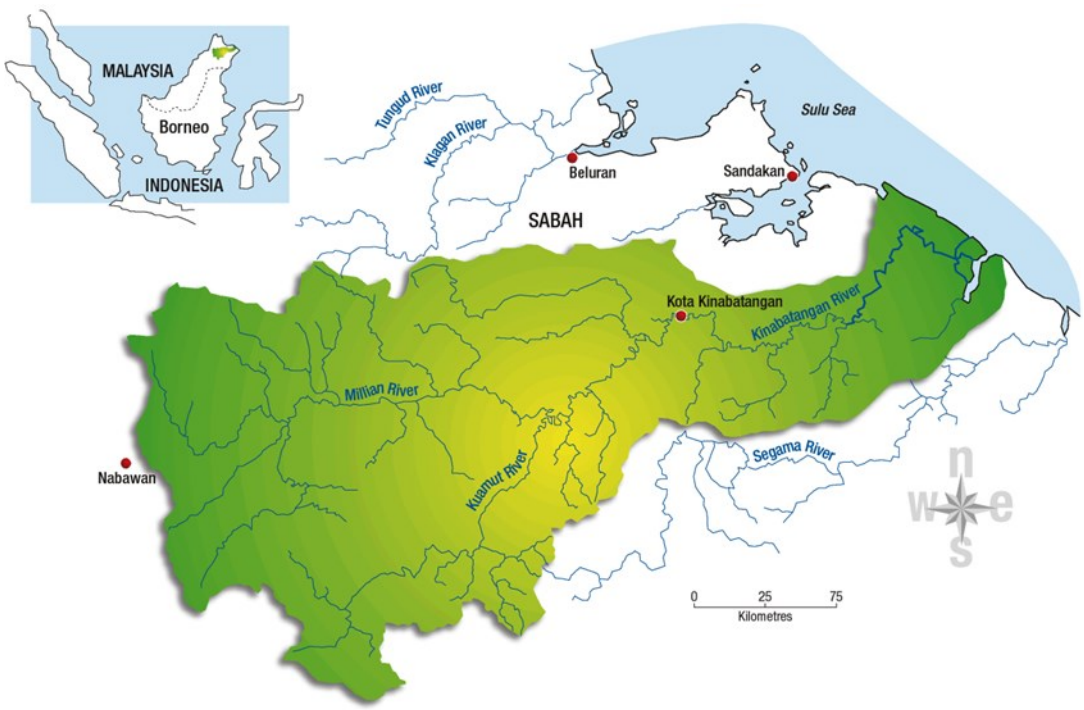

Figure 1: The location of Kinabatangan River in Malaysia and Sabah. The green area shows the Kinabatangan River Basin.
(Source: http://assets.panda.org/img/original/kinabatanganmap.gif)

The Kinabatangan River serves as an important transport route and the local people continue to rely on the river's fish and prawns as a livelihood source. Since 1991 the use of the Kinabatangan River has been diversified with an increased demand for wildlife viewing from its waters. The Kinabatangan District has a total of 104 villages where 13 of which are in the floodplain. Of the eleven major settlements along the Kinabatangan River, four are currently involved in tourism ventures such as Batu Putih, Bilit, Sukau and Abai (Figure 2). This study only concentrated towards two distinct areas from Abai to Bilit.

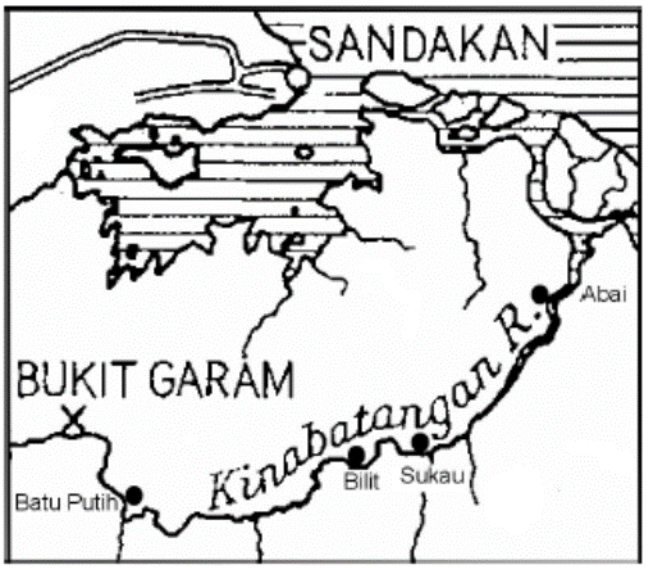

Figure 2: Map showing the location of relevant villages along the Kinabatangan River (Source: Yoshiba, 1964)

Fishes were caught from gill nets of 5.08 cm and 7.61cm stretched mesh sizes. They were transported to the laboratory in a plastic container. All fish samples were examined in the same day without prior preservation.

The identification of fish had been done in the Sukau field centre, which the fishes were identified with standard taxonomic work by Inger & Chin (2002) and Kottelat (1993). Some measurement of fish for morphological description also had been applied through the standard length (SL) and body depth (BD) that were also taken by means of meter rule. The weights of the fish were measured to the nearest gram using an electronic balance.

Later on the examination of fish for parasites started by each fish was dissected from the anus, and the intestine including the stomach was opened up by means of a pair of dissecting scissors and placed in a Petri dish. Parasites were picked by means of a Pasteur pipette and placed in a specimen bottle containing 5.0% alcohol as preservative. The number of parasites per fish and site of infection were noted. The same procedure was used in examining the gills and the internal tissues.

The parasites recovered were first removed from the preservative, washed with water, and placed on a clean slide. A few drops of lactophenol were added and the slide was viewed under the microscope. A few photos of the parasites were taken and the identification will only be done using appropriate keys, such as Yagamuti (1961). In this preliminary study the parasites will be declared by ectoparasite or endoparasite due to the general targets of this study to concentrate on the prevalence of parasitic infection.

RESULTS AND DISCUSSION

The eighty fish specimens examined during the study belong to eleven species, ten genera and ten families. The family Pangasiidae was represented by two species which only comprised by 15% of the total number of individuals. The remaining nine families (Ariidae, Siluridae, Cyprinidae, Engraulidae, Bagridae, Toxotidae, Sciaenidae, Megalopidae and Clariidae) were represented by a species each. The list of fishes, number and percentage (Table 1), which shows the family Ariidae formed 36.3%, the highest number from overall fishes and Clariidae shows the lowest number (1.3%).

Table 1: The number of overall fishes and their infection by Family and Genus & species.

			Number of Infection (%)			
	Famili	Genus & species	Negative	Positive	Total	(%)
1	Ariidae	*Arius maculates*	11 (37.9)	18 (62.1)	29	(36.3)
2	Bagridae	*Mystus nemurus*	3 (60.0)	2 (40.0)	5	(6.3)
3	Clariidae	*Clarias teysmanni*	0 (0.0)	1 (100.0)	1	(1.3)
4	Cyprinidae	*Puntius gonionotus*	6 (75.0)	2 (25.0)	8	(10.0)
5	Engraulidae	*Setipinna melanochir*	2 (33.3)	4 (66.7)	6	(7.5)
6	Megalopidae	*Megalops cyprinoides*	2 (100.0)	0 (0.0)	2	(2.5)
7	Pangasiidae	*Pangasius kinabatanganensis*	4 (80.0)	1 (20.0)	5	(6.3)
8	Pangasiidae	*Pangasius hypopthalmus*	1 (14.3)	6 (85.7)	7	(8.8)
9	Sciaenidae	*Sciaeria sp.*	2 (66.7)	1 (33.3)	3	(3.8)
10	Siluridae	*Kryptopterus parvanalis*	6 (66.7)	3 (33.3)	9	(11.3)
11	Toxotidae	*Toxotes chatareus*	0 (0.0)	5 (100.0)	5	(6.3)
		Total	37 (46.3)	43 (53.8)	80	(100.0)

The overall parasitic infection rate was more than half of sample (53.8%). The ectoparasite infestation rate was 45% whereas the endoparasite remains only 17.5%. Both ectoparasites and endoparasites especially intestinal helminth were recorded.

This preliminary investigation of the parasito-fauna of fish in Kinabatangan River presents 53.8% of infection rate similar to Umuoeren *et al.*(1988) in cultured fish of Nigerian river. This is rather low as compared to other similar work such as those of Awharitoma & Okaka (1999) that recorded 60.8% infection rate for cichlide fishes from Okhuaihe River in Edo State and Onwuliri & Mgbemena (1987) who recorded 60.4%. However Ugwuzor (1987) and Okaka (1991) obtained lower prevalence figures (7.7% and 16.5% respectively) in the fishes examined from Imo River and Asa River Ilorin, respectively. This shows that parasitic infection rates vary greatly from one area to another and this depends on a number of factors which include among other things, the nature of the water which is reflected in the human use and the endemicity of infection in the area as appeared in tropical reservoirs along the Perak River and Langkawi (Hila Bu & Leong, 1997; Rahman & Ali, 1991).

Table 1 also showed only one species of fish did not harbour any parasite (*Megalops cyprinoides* or Indo-Pacific tarpon, n=2, all clean!). Other genera are actually the true

freshwater fishes; on the contrary this Indo-Pacific tarpon migrates between the open sea and inland rivers and inhabits tropical coastal and brackish waters of the Indo-Pacific oceans. To be more precise *Clarias teysmanni* or catfish (n=1) and *Toxotes chatareus* (n=5) were 100% infected by parasites. According to Rahman & Bakri (2008), Rahman *et al.* (1992) and Shaharom *et al.* (1992), the catfish has common prevalence of any type of parasites in Malaysia.

A water body that is being used as a source of drinking water is likely to be a clean water, while that which serves a collecting basin for all kinds of waste (mainly organic waste) are usually unclean and thus capable of harbouring different kinds of organisms including parasites. Okaka & Omoigberale (2002) recorded nematodes as the most common parasite, infecting 18.6% of the fish population: trematodes infecting 13.7%; anthocephalans infecting 8.8%, and cestodes infecting 17.6% of the total fish population. These endoparasites infection range from 18.6% to 8.8% showed the situation was also common in Kinabatangan River (17.5%).

It is however important to mention that the incidence of parasites among fishes of this Kinabatangan River is significantly high. The reason for this may be due to the apparent of pollution in the river, due to the increased of development of palm oil mills and plantation hence the river is also used as the source of portable water by the community especially for tourism.

CONCLUSION

In conclusion, this preliminary study of parasitic infections of some fishes from Kinabatangan River, Sandakan, Sabah with the overall parasitic infection rate was more than half of sample (53.8%). The preliminary data also indicate that almost half population of fishes from these areas could be exposed to parasitic infection.

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