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Prevalence and Intensity of Parasites in Edible Fishes Landing at Karachi Fish Harbour

Shaheena Qasim* and Zarrien Ayub
Centre of Excellence in Marine Biology, University of Karachi, Karachi-75270, Pakistan

Abstract.- The fish randomly picked from the fish lot lying in the hall of the Karachi Fish Harbour for auction were examined for a period of one year from August 2007 to July 2008 to find out the prevalence and intensity of parasites in different species. Out of 44 species of fish examined, 22 species were found to be infected by parasites and a small sciaenid *Johnieops sina* (Cuvier, 1829) was highest in numbers. Among the total number of 263 fish specimens examined for parasites, 47 fish (17.9% of the total sample) were infected. Prevalence of infection was found almost throughout the year with the exception of May 20007, when the average seawater temperature was 27.9ºC. The highest prevalence of infection was observed in October 2007 when the average seawater temperature was 29.5ºC. There was no correlation between seawater temperature and prevalence of parasitic infection ($r = 0.102$; $P > 0.05$). In the present study, among the infected fish, 78.7% were found to be infected by nematodes and 21.3 % by trematodes. The nematode varied from 1 to 12 in numbers per fish. The highest number of nematode (12) were recorded in April'08 in deep flounder, *Pseudorhombus elevatus* Ogilby 1912 (TL = 20.0 cm), when the average seawater temperature was 28.4ºC. The trematode varied from 1 to 4 in numbers per fish. The highest numbers of trematodes (4) were recorded in September'07 in malabar trevally, *Carangoides malabracius* (Bloch and Schneider, 1801) (TL = 22.0 cm), when the average seawater temperature was 28.5ºC. The parasitic infection rate was higher in females (11.6%) than in males (4.6%) but there was no relationship between length of fish and parasitism.

Key Words: Fish parasites, seasonal infection, organal distribution.

INTRODUCTION

Parasitism is a ubiquitous phenomenon in the marine environment and it is probable that all marine fishes are infected with parasites (Ruiz, 1991). The parasite fauna of commercially exploited fish species of the temperate waters is well known as a result of highly developed large-scale fishing industry, while few investigations have been carried out on parasitism of tropical marine fish (Palm *et al.*, 1994).

The fishes found along the coast of Pakistan were reported to be infected by various types of parasites among which trematode are most common. Several species of trematodes have been reported from various fishes on the coast of Pakistan (Bilqees, 1981; Shaukat and Bilqees, 2005). Similarly, the list of nematodes infecting the fishes in Pakistan has also been published (Akhtar and Bilqees, 2006). A comprehensive list of helminth parasites from the fishes of Karachi coast and the organs affected is available (Ghaffar, 2007). The intestine has been reported to be most vulnerable to trematode and nematode infection (Ghaffar, 2007).

In Pakistan though sufficient literature is available on species of parasites infecting the fishes but the studies dealing with seasonal variations of parasitic infection in fish is scarce (Fatima and Bilqees, 1989; Rizwana *et al.*, 1999). Fatima and Bilqees (1989) correlated the incidence of helminth parasites to the summer season in various edible fishes of Karachi coast. Rizwana *et al*. (1999) reported highest infection rate of nematodes in August and lowest in November in the fish, *Lutjanus argentimaculatus*. In the present study, an attempt was made to find out the seasonal variation of parasitic infection in edible fishes landing at the Karachi Fish Harbour.

MATERIALS AND METHODS

From August 2007 to July 2008, each month a subsample of edible fish (15-20) was procured from the fish lot at the auction hall of Karachi Fish Harbour. Fish were brought intact to laboratory and washed with tap water and kept in the freezer till further analyses.

The species of fish were identified following

* Corresponding author: shaheenaqasim@hotmail.com
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the literature Froese and Pauly (1990-2008); Bianchi (1985) and Jhingran and Talwar (1991). The total length (TL) of fish was taken from the tip of the snout to the posterior tip of the caudal fin and was measured to the nearest ±0.1 cm.

The whole body cavity was cut opened and examined for parasites. The various organs including stomach, intestine, liver, swim bladder and gonad were removed and placed in petri dishes. First the external surface of each organ was examined and then each organ was cut opened for examination and parasite if present was removed and examined under binocular microscope to check the group (Chatterjee, 1980).

The prevalence and mean intensity was calculated according to Margolis *et al.* (1982)

RESULTS AND DISCUSSION

During the study 44 species of fish were examined, out of which 22 species were found to be infected by parasites (Table I). Among 263 fish specimens examined for parasites, 47 fish (17.9% of the total sample) were infected. The prevalence of infection was found almost throughout the year with the exception in May, when the average seawater temperature was 27.9º C and the highest prevalence of infection was observed in October'07 when the average seawater temperature was 29.5ºC (Fig. 1). There was no correlation between seawater temperature and prevalence of parasitic infection ($r = 0.102$; $P > 0.05$). In the present study incidence of parasitism in fish was highest in late summer (September-November) and lowest prevalence was found in the spring-early summer (April-May). Fatima and Bilqees (1989) correlated the incidence of helminth parasites to the summer season in various edible fishes of Karachi coast. Rizwana *et al*. (1999) reported highest infection rate of nematodes in August and lowest in November in the fish, *Lutjanus argentimaculatus*. Seasonal variation in the prevalence of parasitism has been reported in two serranid species, *Epinephelus aeneus* and *E. marginatus* from Iskenderun Bay, Turkey (Genc *et al.*, 2005).

Among the infected fishes, 78.7% were found to be infected by nematodes and 21.3% by trematodes. Similarly a higher nematode infection has been reported in *Lutjanus argentimaculatus* from Karachi coast (Rizwana *et al.*, 1999). The highest prevalence of infection by nematode parasites was observed in the month of October'07

Table I.- The fish species examined for parasites during the study period from August 2007 to July 2008. The number in brackets are the fish infected.

S. No.	Species	Total number
1.	*Acanthopagrus latus*	5 (1)
2.	*Anodontostoma chacunda*	2 (0)
3.	*Argyrops spinifer*	1 (0)
4.	*Arius maculates*	1 (0)
5.	*Atule mate*	2 (0)
6.	*Carangoides caeruleopinnatus*	4 (1)
7.	*Carangoides malabaricus*	1 (1)
8.	*Cynoglossus arel*	18 (5)
9.	*Dendrophysa russelli*	2 (0)
10.	*Drepane punctata*	6 (4)
11.	*Ephippus orbis*	6 (2)
12.	*Epinephleus fasciatus*	3 (0)
13.	*Gerres filamentosus*	8 (3)
14.	*Hilsa kelee*	7 (2)
15.	*Ilisha melastoma*	17 (5)
16.	*Johnieops sina*	22 (4)
17.	*Labeo roheta*	1 (0)
18.	*Leiognathus equulus*	5 (0)
19.	*Liza carinata*	7 (1)
20.	*Lutjanus lutjanus*	6 (2)
21.	*Nemipterus japonicus*	21 (2)
22.	*Pampus argenteus*	3 (0)
23.	*Parastromateus niger*	3 (0)
24.	*Pomadasys maculatum*	4 (1)
25.	*Pomadasys stridens*	5 (0)
26.	*Protonibea diacanthus*	8 (0)
27.	*Pseudorhombus arsius*	7 (0)
28.	*Pseudorhombus elevatus*	7 (1)
29.	*Rastrelliger karangurta*	3 (0)
30.	*Scatophagus argus*	10 (1)
31.	*Scolidon scolidon*	2 (0)
32.	*Scomberoides commersonnianus*	4 (0)
33.	*Scomberomorus koreanus*	1 (0)
34.	*Scomberomorus lineolatus*	2 (0)
35.	*Selaroides leptolepis*	1 (0)
36.	*Sillago sihama*	18 (0)
37.	*Sphyraena fosteri*	11 (4)
38.	*Sphyraena putnamiae*	4 (1)
39.	*Strongylura strongylura*	2 (1)
40.	*Terapon jarbua*	11 (2)
41.	*Thunnus obesus*	5 (1)
42.	*Thunnus tanggol*	4 (1)
43.	*Trachurus indicus*	1 (1)
44.	*Upeneus vittatus*	2 (1)

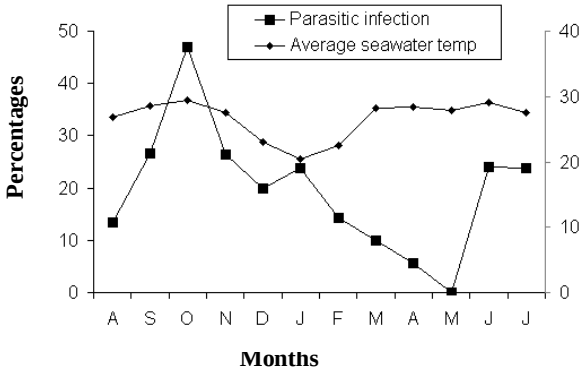

Fig. 1. Prevalence (%) of parasites and temperature variations during the period from August 2007 to July 2008.

Table II.- Prevalence and mean intensity of nematode and trematode parasites in various months during the period from August 2007 to July 2008.

Months	Prevalence (%)		Mean intensity	
	Nematode	Trematode	Nematode	Trematode
August	0	4.3	0	2.5
September	4.3	4.3	3.0	3.5
October	14.9	2.1	3.6	2.0
November	8.5	2.1	4.3	1.0
December	6.4	2.1	4.0	2.0
January	8.5	2.1	3.8	2.0
February	6.4	0.0	4.7	0.0
March	6.4	0.0	4.3	0.0
April	4.3	0.0	9.5	0.0
May	0.0	0.0	0.0	0.0
June	12.8	0.0	4.0	0.0
July	6.4	4.3	4.0	1.5

(14.9%) and by trematode in August-September'07 and July'08 (4.3% each month) (Table II). The trematode infection in fish was absent from February to June'08 as compared to nematode infection which was absent in August'07 and May'08. It was in the month of May'08 that all 24 specimens of fish were uninfected (Table II). There was no correlation between seawater temperature and prevalence of nematode infection ($r = 0.083$; $P>0.05$) and trematode infection ($r = -0.005$; $P>0.05$).

The nematode varied from 1 to 12 in numbers per fish. The highest number of nematodes (12) were recorded in April'08 in *Pseudorhombus elevatus* (Ogilby, 1912) of TL = 20.0 cm and the second highest (10) in November 2007 in *Gerres filamentosus* (Cuvier, 1829) (TL = 26.0 cm). The trematode varied from 1 to 4 in numbers per fish. The highest number of trematodes (4) were recorded in September 2007 in *Carangoides malabaricus* (Bloch and Schneider, 1801) of TL = 22.0 cm. Santos and Eiras (1995) studied the seasonal occurrence of the digenea, *Helicometra fasciata* and *Lecithochirium furcolabiatum* infecting the fish, *Lepophyrs pholis*, in Portugal waters during the period from November 1988 to November 1989. Intensity of infection by *Helicometra fasciata* varied from 1 to 116 parasites per fish, while the intensity of infection by *Lecithochirium furcolabiatum* were found to be 1 to 216 parasites per fish.

The mean intensity of parasites in fish during the study was 3.8 parasites/fish. The highest mean intensity (9.5 parasites/fish) was recorded in April'08 and nil (no parasites/fish) in May'08. The highest mean intensity of nematodes (9.5 parasites/fish) was found in April'07 (Table II) and highest mean intensity of trematodes (3.5 parasite/fish) was recorded in September'07 (Table II).

The distribution of parasites in organs were found to be maximum in intestine (48.9%), while in the stomach it was 31.9% and minimum in swim bladder (4.3%) (Table III).

Table III.- Organal distribution of parasites in fishes (n=47).

Organs	Parasites number	Parasites percentage
Liver	7	14.9
Intestine	23	48.9
Stomach	15	31.9
Swim bladder	2	4.3

Out of 263 fishes examined, 181 were females, 56 males and 26 unsexed. The highest parasitic infection was observed in the female fishes (11.0% of the total fish) (Table IV). Similarly in hake, *Merluccius gayi* from Chile, the infection by nematode larvae was higher in females than in males (Carvajal *et al.*, 1979), whereas statically no significant difference in parasitic infection of male and female fish, *Cyprinus carpio* was found from Turkey (Ozer, 2000).

Table IV.- Percentages of female, male and unsexed fishes in various size-classes during the period from August 2007 to July 2008.

Size-class (cm)	Fish examined			Fish infected with parasites		
	Females	Males	Unsexed	Females	Males	Unsexed
8.0-14.9	22	7	3	1 (0.4)	3 (1.1)	0
15.0-21.9	93	31	18	16 (6.1)	4 (1.5)	5 (1.9)
22.0-28.9	53	16	4	9 (3.4)	3 (1.1)	1 (0.4)
29.0-35.9	13	2	1	3 (1.1)	2 (0.8)	0
Total	181	56	26	29 (11.0)	12 (4.5)	6 (2.3)

In the present study no relationship was observed between length of fish and parasitism as the larger sized fishes were less infected than the smaller sized fishes. The highest numbers of female and male fishes infected by parasites belonged to the medium size-class, 15.0-21.9 cm (Table IV). Similarly, Wicken and Macfarlane (1973) have reported no correlation between length of fish and level of infestation in the plaice, *Pleuronectes platessa*. There are studies in which it has been reported that parasitic infection increased with length of fish such as in herring, *Clupea harengus* (Khalil, 1969), in English sole, *Parophyrs velutus* from Oregon coast, USA (Olson, 1978) and in hake, *Merluccius gayi* from Chile (Carvajal *et al.*, 1979).

In the present study the fish were randomly picked from the fish lot lying in the hall of the Karachi Fish Harbour for the study of parasites. Out of 44 species of fish examined, 22 species were found to be infected by parasites. The infection by nematode was higher than trematode. Though the parasitic infection was found to be comparatively higher in summer than winter but no correlation was observed between seawater temperature and prevalence of parasitic infection ($r = 0.102$; $P>0.05$).

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