A REPORT OF OCCURRENCE OF GONAD INFECTING NEMATODE *PHILOMETRA* (COSTA, 1845) IN HOST *PRIACANTHUS* SP. FROM PAKISTAN

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ABSTRACT

Philometra parasites were collected from gonads of the host fish *Priacanthus* sp. whilst among 17 specimens 10 specimens were found to be parasitized by Nematode *Philometra*. Parasite is known to cause destruction, hemorrhage, and fibrosis within gonads of infected fish. Total length and width of each *Philometra* parasites was measured and recorded size ranged (total length) between 130 mm (minimum) to 196 mm (maximum) mm whereas, measured width was 1.1 and 1.4mm whereas calculated prevalence was remain 58.82 %. This is the first report of occurrence of this parasite in marine fish from Pakistan.

Key words: Nematodes, Philometra, *Priacanthus* spp. Karachi Fish Harbour, Pakistan

INTRODUCTION

Fish carry a wide range of taxonomically diversified parasites with economical and public health impact. Parasites play very important role in fish as it effects their growth and development during their life cycle as well as food born parasitic infections are also known as an important public health problem. Parasites are organisms that live in and on other organisms, in a relationship, which is an obligate one for the parasite. The prevalence and intensity of parasitic infection varies with fish species, fishing area, feeding habits and season. Nematode parasites penetrate into the organs that may cause destruction of various tissues and cells (Fatima and Bilqees, 1987; Moravec and de Buron 2013). There is an extensive range of parasites of marine fish while few nematode parasites are of public health concerned (Adams *et al*., 1997). Gonad infecting marine parasite *Philometra* in marine fish speciess are widely distributed in all oceans (Moravec 2016). Certainly different nematode parasites have also been reported from Pakistan. However, information on them, such as prevalence, intensity, geographical distribution, taxonomy, biology are generally limited. Sattar *et al*. (2016) reported the nematode parasites belonged to four different genera viz.,*Raphidascaris acus* (Bloch, 1779) larvae, *Metabronema magnum* (Taylor, 1925), *Haplonema immutatum* (Ward et Magath, 1917) and *Hedruris bryttosi* (Yamaguti, 1935) found in cat fish. Nevertheless, this is the first report of occurrence in marine fish (*Priacanthus* sp.) from Pakistan.

MATERIALS AND METHODS

A total of seventeen (17) specimens of marine fish *Priacanthus spp*. were obtained from Karachi fish harbor during September and January 2015 (Fig. 1). All specimens were identified, measured and clinically examined for parasitological studies by the help of published literature i. e., FAO (2015); Moravec *et al*. (2015 and 2016); Conroy and Hermann, (1981); Moravec *et al*. (2014, 2015 and 2016).

Collected samples were kept on sliced ice and brought to the IMS laboratory. For detailed examination the abdominal cavity of each fish was cut opened and the gastrointestinal tract, liver, spleen, genital organ, were removed and cut into parts and placed in petri dishes containing physiological saline for microscopy (wet mount), observed under stereo microscope (4x & 10x Magnification). Each visceral organ examined fully for internal parasite detection. *Philometra* were carefully collected from the gonads either fixed in AFA (alcohol, formalin and acetic acid) at 65°C, and preserved in alcohol 70% with 5% glycerin and some of these isolated parasites were dehydrated, cleaned with xylene and mounted in canadabalsam for detailed examination.

Statistical analysis

Indices were calculated as described by earlier workers (Margolis *et al*., 1982; Poulin and Rohde, 1997) are given below:

$$\textbf{Prevalence} = \frac{\text{Number of specimen infested with parasites}}{\text{Total number of specimen examined}} \times 100$$

Abundance = Total number of individual parasite in a sample of hosts / Total number of individuals of host's species

Incidence of infection = Total number of individuals of host's species in infected host x 100 / Total hosts examined

Intensity = No. of parasites collected in a sample / No. of infected hosts

Index of infection = No. of hosts infected x No. of parasites collected / Total hosts examined

RESULTS AND DISCUSSION

A total of seventeen (17) specimens of marine fish *Priacanthus* spp. were obtained from Karachi fish harbor during September-October 2015and out of which ten (10) specimens were found infected by nematode parasites (Table 1) (Figures 2 and 3a, b). Nematode parasite (*Philometra* sp.*)* was identified on genus level; systematic account is given below:

Phylum: Nematoda
Class: Secernentea
Order: Chromadorea
Family: Philometridae (Baylis and Daubney, 1926)
Genus: Philometra (Costa, 1845)
Specie: *Philometra sp.*

Host: *Priacanthus* sp.
Locality: Karachi fish Harbor

Results of examination revealed the presence of *Philometra* mainly in the ovarian lumen and in the oviduct that caused hemorrhage, inflammation, edema, necrosis and destruction of gonadal tissues due to the penetration of gonadal wall, as well as hepatomegaly of the liver was also seen during the present study in host sp. Total length and width of each *Philometra* parasites was measured and recorded, size range falls between 130-196 mm (minimum-maximum length) whereas, width ranged between1.1 and 1.4mm. Parasite infestation incidence, intensity, density and index were calculated according to (Poulin and Rohde, 1997). Recorded prevalence was 58.82%, Incidence rate was 8.47%, intensity 12.20 respectively, whereas index of infestation reached 71.76%. Color the female *Philometra* was found dark brown. The posterior end and interior end as well as the esophageal bulb was observed found to be less undeveloped in subgravid female whereas, cephalic portion of each individual seen was well-developed.

Table 1. Host and parasite distribution data with calculated indices for fish species collected from Karachi Fish Harbour during September 2014 to October 2015.

Host species	*Priacanthus spp.*
Total No. of individuals examined	17
Host size mm (min)	23.6
Host size mm (max)	37.4
No. of infested individuals	10
No. of parasites	122
Prevalence %	58.82
Abundance	7.18
Incidence	8.47
Intensity	12.20
Index of infestation	71.76

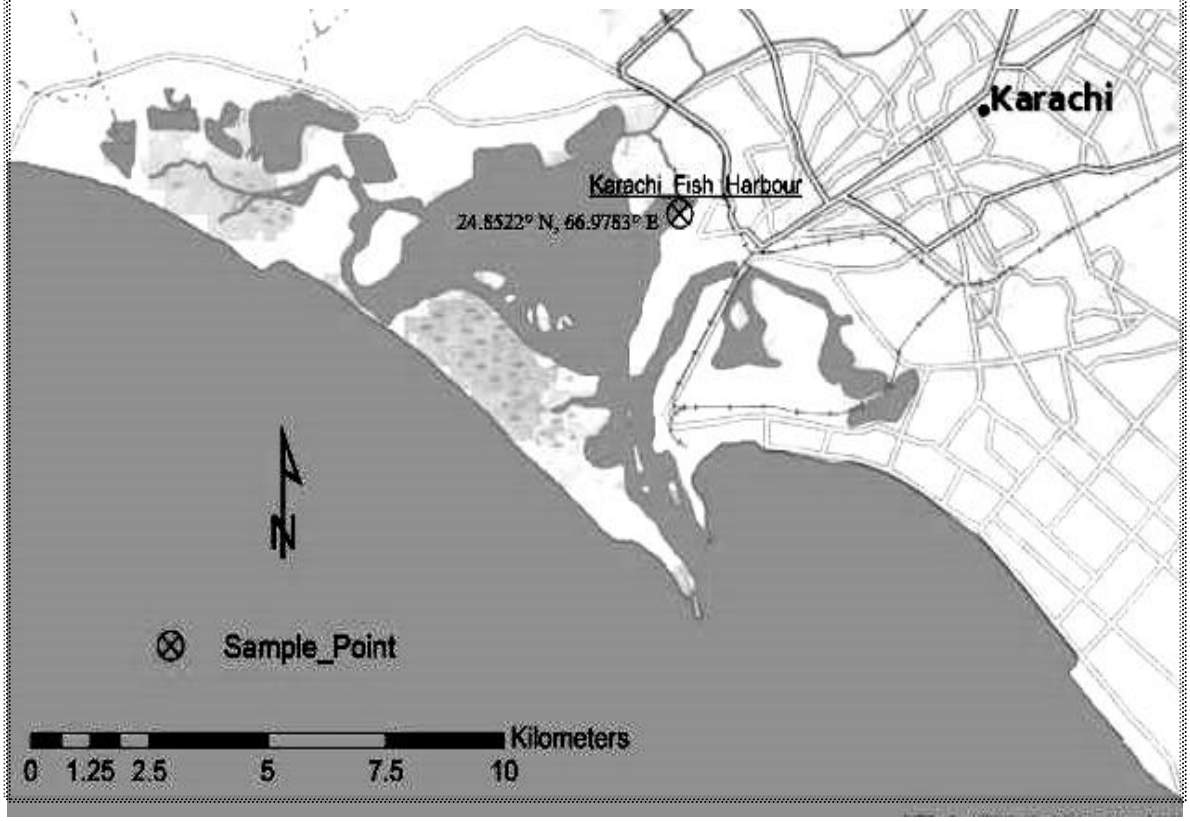

Fig. 1. Map is showing main collection site (Karachi Fish Harbour).

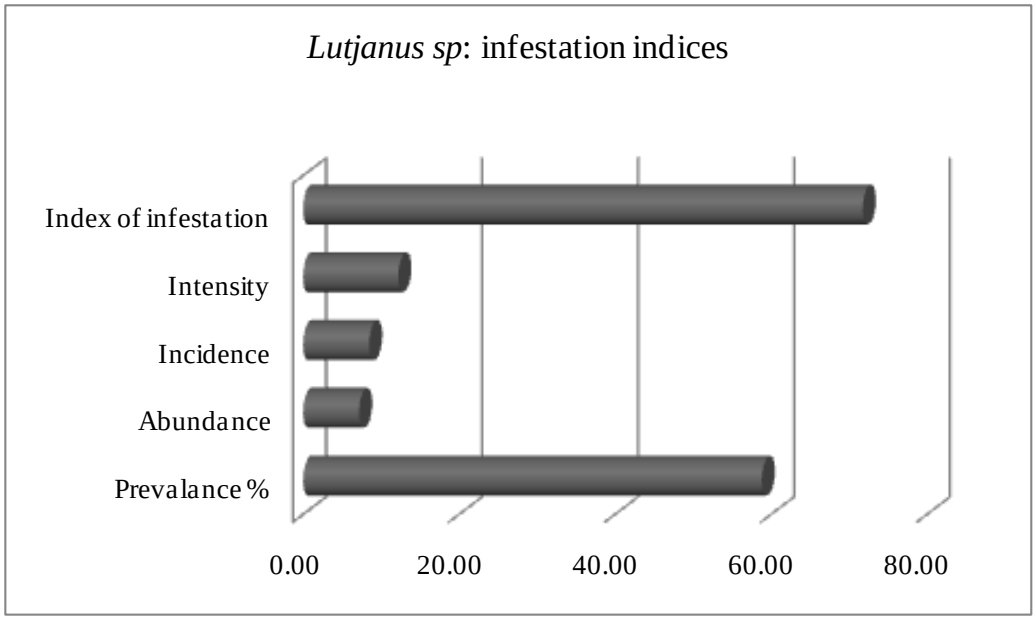

Fig. 2. Showing infestation indices for host *Priacanthus sp.* collected from Karachi Fish Harbour during September and October 2015.

There are many gonad-infecting species of Philometra parasitizing marine fishes. During studies in dissected fish infection was found to be associated with a range of signs and symptoms including hemorrhage, inflammation, edema, necrosis and destruction of gonadal tissues due to the penetration into gonadal wall by parasite as well as

Hepatomegaly of the liver was also seen. Out of 17 specimens of examined fish gonads of 10 hosts were found to be infected by *Philometra* which comes under family *Philometridae* besides gonad infecting philometra species are still indistinguishable (Moravec, 2015; Moravec et al., 2016) as described and recorded by earlier workers from off the northern coast of Australia in *Lutjanus Johni* and in groupers off Tunisia (Moraevic *et al.,* 1994, 1999; Moravec *et al.,* 2015; Moravec et al., 2016). Previously eight gonad-infecting species of *Philometra* have been described from different *Lutjanus* spp. (Moravec *et al.,* 2014). Moravec *et al.* (2014) reported the two new species which are *Philometra argentimaculati* and *Philometra fulvi* from *Lutjanus* sp. in the Bay of Bengal, India. Since gonad-infecting species of *Philometra* exhibit a high degree of host specificity.

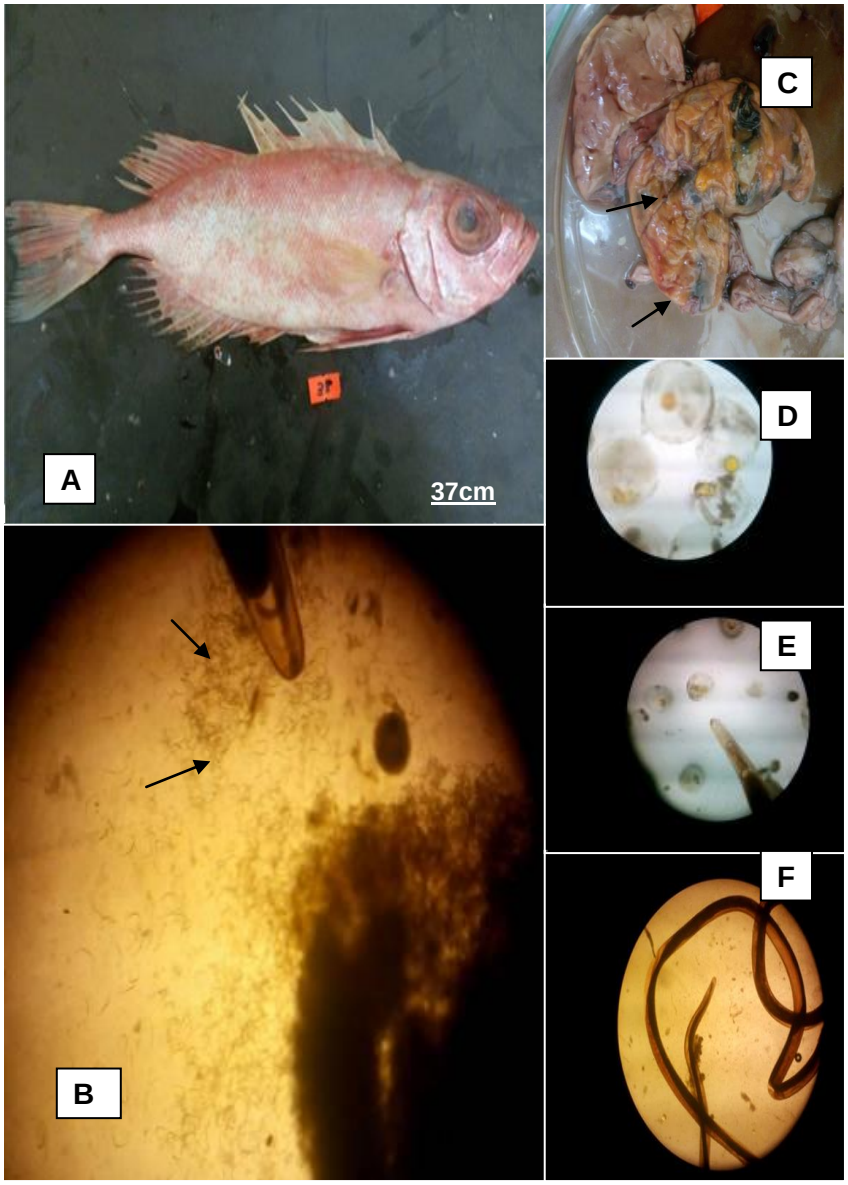

Fig. 3A. Photographs showing host *Priacanthus spp.* (A): Wet mount examination showing the releasing larvae from cut surface of female *Philometra* sp (B); black arrows showing the occurrence of *Philometra* inside the infected fish gonad (C); eggs of infected fish (10x magnification) (D); eggs of infected fish and female *Philometra* in wet mount (4X) (E); photograph of an adult *Philometra* individual (F).

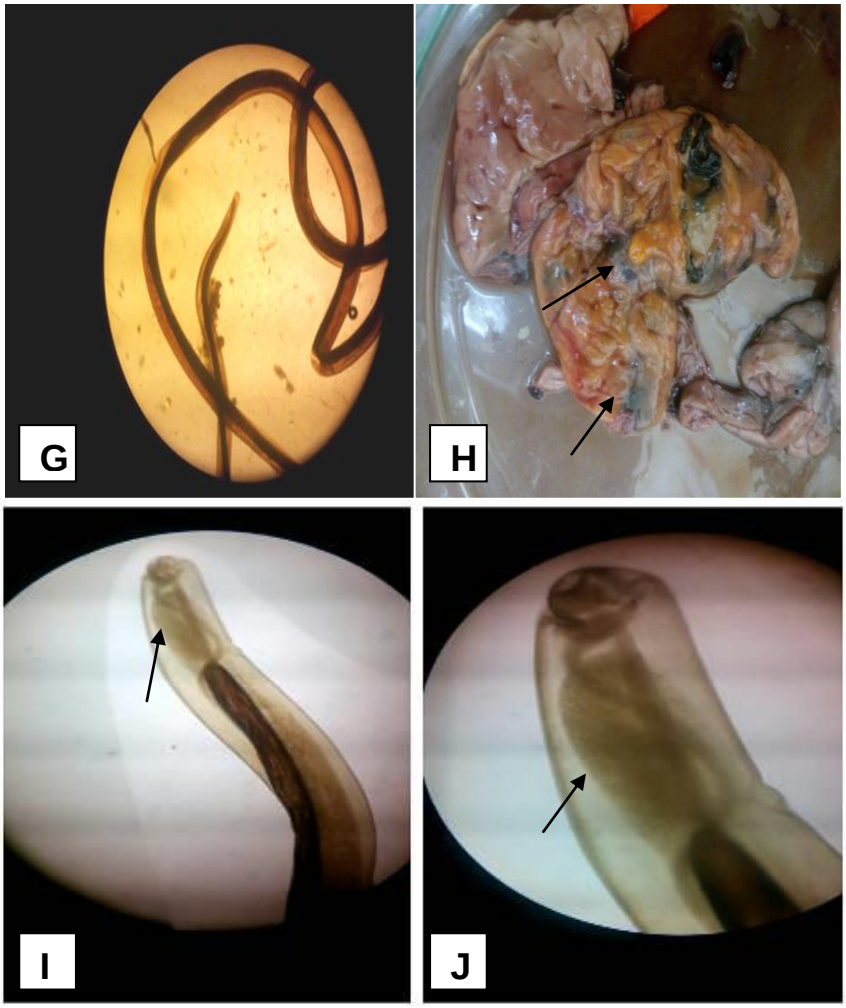

Fig. 3B. *Philometra* spp. (G); Gonadal mass of *Priacanthus spp.* Contaminated with *Philometra* (H); Posterior end of a subgravid female (lateral view) (4x) (I). Anterior end of subgravid female containing colossal miniature inside *Philometra* (black arrows) (10x) (J).

In contrast to large females, the males of philometrids are very small (body length about 2 mm). Furthermore, it has lately indicated that the male morphology is very much significant for the correct species identification (Moravec *et al*., 2008a, b; 2009; Moravec and Justine 2009; Quiazon *et al*., 2008). Moravec *et al.* (2015) explained the gravid, subgravid and nongravid female of *Philometras.* During the present studies, nematode subgravid female *Philometra sp.* were extracted from the gonads of female *Priacanthus* fish. *Philometra* parasite is known to infect various organs, tissues and body cavities of various host fishes in all over the world but mainly gonads. They are mainly found in fish gonads (ovaries) in conspecific females (Clarke *et al.*, 2006; Quiazon *et al.* 2008; Moravec 2006). Therefore seasonal effect of this gonad infecting parasite has also been observed and it seems that there is a relationship between the prevalence and intensity of gonad infecting female *philometra* with their host's spawning season. Moreover, due to severe infection *Philometra* can cause "Parasitic Castration" in female fish , as parasite can feed on ovarian fluid, so that host loses their reproductive process (Clarke *et al.*, 2006; Quiazon *et al.* 2008; Moravec 2006; Moravec and de Buron 2013). Chavez and Oliva, (2011) described the effect and reproductive loss of red cusk-eel, *Genypterus chilensis* due to the infection of *Philometra chilensis* inside the ovary. Moreover, Marino *et al.* (2016) described the occurrence and prevalence of *Philometra filiformis* parasite on *Pagellus*

erythrinus from the Southern Tyrrhenian Sea. They also explained the effects of *P. filiformis* on maturity stages and spawning periods of host and certainly may lead to reproductive lose in females. Thus, there is need to under take thorough investigations on the topic to unveil the facts and status so may we can maintain seafood quality issues.

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