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Original Article

# Occurrence of new *Philometra sp.* in mangrove red snapper *Lutjanus argentimaculatus* from the Karachi coast, Pakistan

## Ocorrência de uma nova espécie de *Philometra sp.* no pargo-vermelho de mangue *Lutjanus argentimaculatus* da costa de Karachi, Paquistão

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**Abstract**

A recent examination of *Philometra* nematodes from mangrove red snapper *Lutjanus argentimaculatus* (Forsskal, 1775) from the Karachi coast, Kemari was done in the years 2021–2022. The present study reported three new species of genus *Philometra* (Costa, 1845) (Nematoda: Philometridae) *Philometra kolachii*, *Philometra lutjani* and *Philometra kemarii.* A total of 140 fish samples were examined, and 76 were infected. The intensity of infected fish was 54.28%. In Pakistan, literature on Philometrid nematodes is limited, therefore, this research would be helpful for the documentation and enhancement of nematods in Pakistan.

**Keywords:** *Philometra*, *Lutjanus argentimaculatus*, Karachi coast, infected fishes, Pakistani fauna.

**Resumo**

Um exame recente dos nematóides *Philometra* do pargo vermelho de mangue *Lutjanus argentimaculatus* (Forsskal, 1775) da costa de Karachi, Kemari, foi feito nos anos 2021 e 2022. O presente estudo relatou três novas espécies do gênero *Philometra* (Costa, 1845) (Nematoda: Philometridae): *Philometra kolachii*, *Philometra lutjani* e *Philometra kemarii*. O total de 140 amostras de peixes foram examinadas e 76 estavam infectadas. A intensidade de peixes infectados foi de 54,28%. No Paquistão, a literatura sobre os nematóides *Philometrid* é limitada, portanto, esta pesquisa seria útil para a documentação e aprimoramento dos nematóides no Paquistão.

**Palavras-chave:** *Philometra*, *Lutjanus argentimaculatus*, costa de Karachi, peixes infectados, fauna paquistanesa.

## 1. Introduction

Fisheries play an essential role in feeding the world's growing population and play a crucial role in global human nutrition as a source of essential nutrients (Abidin et al., 2022). Healthy fish populations lead to healthy oceans, and it is our responsibility to be a part of the solution (Hussain et al., 2021; Khalid et al., 2021; Hassan et al., 2021, 2022). The Arabian Sea of Pakistan is one of the most identical sea worldwide and has diverse fish fauna (≈1,000 species) due to nutrient-rich waters (Hassan et al., 2024). A total of 749 species belonging to 261 genera of 81 sub-familes, 85 families of 24 Super-familes, 19 sub-orders of 12 orders have been reported and described so far from Pakistan, in which 232 species are new (Shahina et al., 2019). However, fish diseases due to helminth parasites, especially *Philometra* species, are the primary worry in aquaculture. *Philometra* are responsible health problem of fish and mainly affect fish growth and population parameters. Because of difficulties in studying Philometrid nematodes associated with their morphological and biological peculiarities, most of them remain poorly known, and their identification is usually difficult and problematic (Moravec, 2004). Moravec et al. (2014) discovered three new gonad-infecting species of *Philometra* (Nematoda: Philometridae) that were previously undescribed species of *Philometra* Costa, 1845 (Nematoda). They collected them from the northern red snapper *Lutjanus campechanus* (Poey), grey snapper *L. griseus* (Linnaeus), lane snapper *L. synagris* (Linnaeus) and silk snapper *L. vivanus*

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(Cuvier) (Lutjanidae) from the northern Gulf of Mexico, Florida, USA. Moravec and Justine (2015) reported new *Phiolmetra* from New Caledonia, namely *P. cephalopholidis* sp. n. in the marine *Cephalopholis sonnerati*. However, there is very limited information of the presence of nematodes in the mangrove red snappers in Pakistan. Thus, the main objective of this study was to collect and identify the variety of nematodes (Philometrids) from the gonads of a edible marine fish *Lutjanus argentimaculatus* and to measure their intensity in the gonads of mangrove red snapper. We provide the first evidence in mangrove red snapper species of the occurrence of parasites typically known from the Karachi coast, It can also be significant to indicate disease management for mariculture system and will facilitate evaluation of possible interactions with wild fish stocks.

## 2. Material and Method

Mangrove red snappers were collected from the Karachi coast, Kemari from February 2021 to January 2022 and were brought to the laboratory of Zoology, University of Karachi. In the laboratory, the desired number of fishes was marked, and then the total length and sex of the fishes were observed. Upon dissecting ovaries, nematodes of the family Philometridae were easily recognized and were separated from infected ovaries. Identification of species were done according to Yamaguti (1961). They were preserved in a mixture of 70% alcohol and glycerin. The micrometry process was done to measure various characteristics of *Philometra sp*. Drawings were made with the aid of a ZEISS microscope drawing attachment. All measurements are in millimeters unless otherwise indicated.

## 3. Results

From marine fish *Lutjanus argentimaculatus* (Forsskal, 1775) off Karachi coast, Kemari, three new species of genus *Philometra* (Costa, 1845) (Nematoda: Philometridae) *Philometra kolachii*, *Philometra lutjanii* and *Philometra kemarii* were discovered.

### *3.1. Philometra kolaachii (n.sp.) (Figure 1a-1d)*

Family: Philometridae (Baylis and Daubney, 1926)
Sub-family: Philometrinae (Baylis and Daubney, 1926)
Genus: *Philometra* (Costa, 1845)
Host: *Lutjanus argentimaculatus* (Forsskal, 1775)
Location: Karachi coast, Pakistan
Locality: Gonads (Ovary)
No specimen recovered: 35

### *3.2. Diagnosis*

#### *3.2.1. Female characters*

The body of *Philometra kolaachii* is elongated, striated from the anterior end, brown in colour, with a distinct dark brown intestine. Both ends are rounded (see Figure 1a-1b). Body length measures 102.6-108 mm long and 0.61-0.68 mm wide. The anterior end of the oesophagus is inflated and is 0.072-0.09 mm long and 0.12-0.129 mm wide. While posterior part of the oesophagus is elongated cylindrical, slightly curved, and attached with a distinct valve to the intestine. The length of the oesophagus is 0.822-0.95 mm, and the diameter is 0.04-0.07 mm. The nerve ring is nearer to the anterior extremity at 0.223-0.251 mm on the oesophagus (see Figure 1c). The size of the ventriculus is 0.08-0.097 mm. Ovaries can be observed in the anterior

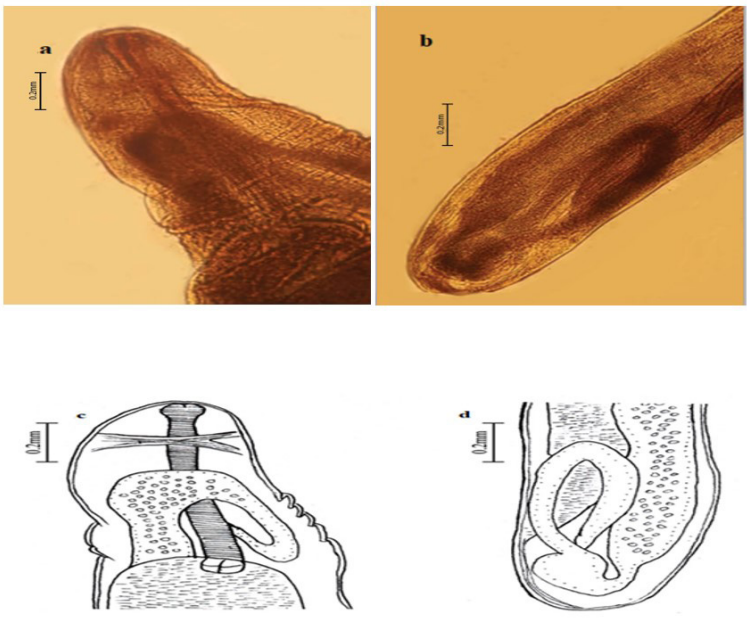


**Figure 1.** a: Anterior end of *Philometra kolaachii* (n.sp.) (×10); b: Posterior end of *Philometra kolaachii* (n.sp.) (×10); c: Drawing of the anterior end of *Philometra kolaachii* (n.sp.) showing the oesophagus, nerve ring and ovary; d: Drawing of the posterior end of *Philometra kolaachii* (n.sp.) showing the caudal region.

and posterior regions. The length of the intestine is 75.6-79.2 mm, and the diameter is 0.54-0.61mm. The anterior end of the intestine is broad, while the posterior end is ending blindly near the caudal end. The tail length, from where the intestine end to the posterior portion, is 0.43-0.47 mm in length (see Figure 1d). The intestine is attached with a ligament of length 0.1656-0.1908 mm. The cephalic end is rounded, 0.098-0.126 mm wide, and the caudal end is 0.224-0.252 mm wide (as shown in Table 1).

**Male:** Unknown

Etymology

The present specimen is identified as *Philometra kolachii*. The given species' name relates to the old name of Karachi.

### *3.2.2. Remarks*

Snappers (*Lutjanus spp.*) have already been recorded as hosts of gonad-infecting species of *Philometra*. Linton (1907) and Rees (1970) reported *Ichthyonema* (*Philometra spp.*) from the gonads of *Lutjanus synagris* and *Lutjanus spp.* from Bermuda, which was considered by Moravec et al. (1988) to be probably *Philometra lateolabracis* (Yamaguti, 1935). Type-species: *Philometra sp.* is also recorded from many other fishes from different parts of the world. The present specimen is recovered from the gonad of host *Lutjanus argentimaculatus* (Forsskal, 1775) from Karachi coast, Pakistan. Other type species recorded are *Philometra kidakoi* (Moravec et al., 2019), from the ovary of *Gymnothorax kidako* (Temminck & Schlegel), reported in Japan; *Philometra cryptocentri* (Yamaguti, 1961) redescribed by Moravec et al. (2012), from specimens recovered from the abdominal cavity of *Acanthogobius flavimanus* (Temminck & Schlegel), *Pterogobius elapoides* (Günther). Reported from the Southern Sea of Japan.; *P. carolinensis* (Moravec et al., 2006), is described from the spotted seatrout, *Cynoscion nebulosus* (Cuvier), in estuaries on the Atlantic coast of South Carolina, USA.

The body length is smaller than that of the gravid of *P. carolinensis* (Moravec et al., 2006) and larger than that of the gravid specimen of *P. kiddakoi* (Moravec et al., 2019) and gravid specimen of *P. cryptocentri* (Moravec et al., 2012). *It* is thinner when compared with the sub-gravid P. kiddakoi (Moravec et al., 2019), and the gravid specimen of *P. cryptocentri* (Moravec et al., 2012). The length and width of anterior oesophageal inflation are smaller than that of the gravid specimen of *P. carolinensis* (Moravec et al., 2006) and the gravid specimen of *P. kiddakoi* (Moravec et al., 2019). Oesophagus is not as long as that in the gravid specimen of *P. carolinensis* (Moravec et al., 2006) and the gravid specimen of *P. kiddakoi* (Moravec et al., 2019). The nerve ring is located nearer to anterior inflation at present as compared with that of the gravid specimen of *P. kiddakoi* (Moravec et al., 2019) and the gravid specimen of *P. cryptocentri* (Moravec et al., 2012). The size of the Ventriculus is greater than *Philometra cryptocentri* (Moravec et al., 2012).

The cephalic width is smaller than the gravid specimen of *P. cryptocentri* (Moravec et al., 2012). Caudal width is greater than the gravid specimen of *P. carolinensis* (Moravec et al., 2006). The intestinal ligament is longer than that found in the gravid specimen of *P. carolinensis* (Moravec et al., 2006). Based on variation in characters, the diagnosed *Philometra* is a new specie named *Philometra kolaachii*.

**Table 1.** Comparison of previously recorded species of genus *Philometra* (Costa, 1845) with *Philometra kolaachii* (n.sp.).

| **Philometra sp.** | ***P. kolaachii* (n.sp.)** | ***P.carolinensis* (Moravec et al., 2006)** | ***P.kiddakoi* (Moravec et al., 2019)** | ***P.cryptocentri* (Moravec et al., 2012)** |
|---|---|---|---|---|
| Host | *Lutjanus argentimaculatus* | *Cynoscion nebulosus* | *Gymnothorax kidako* | *Acanthogobius flavimanus; Pterogobius elapoides* |
| Locality | Karachi | South Carolina, USA | Japan | Japan |
| Gender | Female | Female | Female | Female |
| Size of the body (mm) | (102.6-108) (0.61-0.68) | (115-156)(0.56-0.65) | (82)(1.43) | (81.6-129)(0.8-1.1) |
| Size of lip (mm) | (0.072-0.09) (0.12-0.129) | (0.66-0.63)(0.57-0.6) | (0.12)(0.18) | - |
| Size of the oesophagus (mm) | (0.822-0.95) (0.04-0.07) | (1.10-1.25) | (1.77)(0.15) | (0.7-1.25) |
| Size of the intestine (mm) | (100.8-104.4) (0.25-0.28) | - | - | - |
| Cephalic width (mm) | (0.098-0.126) | - | - | (0.2-0.24) |
| Caudal width (mm) | (0.224-0.252) | (0.17)(0.24) | - | (0.23-0.29) |
| Nerve ring from anterior (mm) | (0.223-0.251) | (0.204-0.286) | (0.4) | (0.17-0.27) |
| Size of ventriculus (mm) | (0.08-0.097) | - | - | (0.023-0.029) (0.051-0.081) |
| Size of the ligament (mm) | (0.1656-0.1908) | (0.03) | - | - |

*3.2.3. Philometra lutjani (n.sp.) (Figure 2a-2d)*

Family: Philometridae (Baylis and Daubney, 1926)
Sub-family: Philometrinae (Baylis and Daubney, 1926)
Genus: *Philometra* (Costa, 1845)
Host: *Lutjanus argentimaculatus* (Forsskal, 1775)
Location: Karachi coast, Pakistan
Locality: Gonads (Ovary)
The number of specimens recovered: 21

*3.3. Diagnosis*

*3.3.1. Female characters*

The body of the parasite is elongated and whitish brown in colour, with both ends rounded. The cuticle is smooth, intestine is visible. The body is 79.2-84.6 mm long and 0.68-0.72 mm wide. The anterior part of the oesophagus from inflation is 0.097-0.1008 mm long and 0.1152 mm wide. The oesophagus is long, cylindrical, and muscular, measuring 1.027-1.08 mm in length and 0.112-0.154 mm wide (see Figure 2a and 2c). Oesophagus is joined to the anterior broadened end of the intestine, with a distinct valve anterior portion of the intestine occupying more than half of the body width. Ovaries are observed in the anterior and posterior regions (see Figure 2c-2d). The uterus is extended till the anterior inflation of the oesophagus. The intestine is 75.6-79.2 mm long and 0.54-0.61 mm wide. The tail length, from where the intestine end to the posterior portion, is 2.41-2.59 mm long and 0.28-0.39 mm wide (see Figure 2b and 2d). The ligament measures 3.24-3.6 mm long. Both ends are rounded without any projection. The cephalic width is 0.126-0.154 mm, and that of the caudal width is 0.168-0.182 mm (as shown in Table 2).

**Male:** Unknown.

Etymology

The present specimen is identified as *Philometra lutjani*. The given specie name relates to the generic name of the host fish.

*3.3.2. Remarks*

Type-species: *Philometra sp.* is also recorded from many other fishes from different parts of the world. The present specimen is recovered from host *Lutjanus argentimaculatus* (Forsskal, 1775) from the Karachi coast, Pakistan. Other type species recorded are *P. haemulontis* (Moravec et al., 2020) (males and females) from the ovary of *Haemulon plumierii* and *H. aurolineatum* (Cuvier) reported from off the Florida coast in the Gulf of Mexico and Straits of Florida, USA.; *Philometra cryptocentri*, (Yamaguti, 1961) redescribed by Moravec et al. (2012), from the Southern Sea of Japan, from specimens recovered from the abdominal cavity of *Acanthogobius flavimanus* (Temminck & Schlegel), *Pterogobius elapoides* (Günther).; *Philometra kidakoi* (Moravec et al., 2019), from the ovary of *Gymnothorax kidako* (Temminck & Schlegel), in Japan.

The length and width of anterior bulbous inflation are smaller than the gravid specimen of *P. kiddakoi* (Moravec et al., 2019) but somewhat larger than that of the sub-gravid specimen of *P. haemulontis* (Moravec et al., 2020). The length of the cylindrical portion of the oesophagus is smaller than the gravid specimen of *P. kiddakoi*

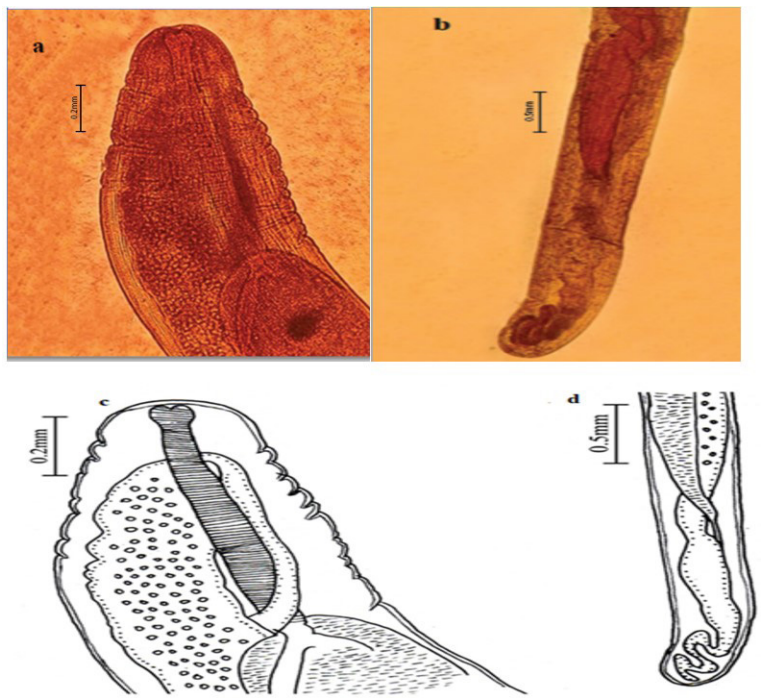


**Figure 2.** a: Anterior end of *Philometra lutjani* (n.sp.) (×10); b: Posterior end of *Philometra lutjani* (n.sp.) (×4); c: Drawing of the anterior end of *Philometra lutjani* (n.sp.) showing the oesophagus, nerve ring and ventriculus; d: Drawing of the posterior end of *Philometra lutjani* (n.sp.) showing the caudal region.

**Table 2.** Comparison of previously recorded species of genus *Philometra* (Costa, 1845) with *Philometra lutjani* (n.sp.).

| ***Philometra sp.*** | ***P. lutjani* (n.sp.)** | ***P. kiddakoi* (Moravec et al., 2019)** | ***P. haemulontis* (Moravec et al., 2020)** | ***P. cryptocentri* (Yamaguti, 1961)** |
|---|---|---|---|---|
| Host | *Lutjanus argentimaculatus* | *Gymnothorax kidako* | *Haemulon plumierii; H. aurolineatum* | *Acanthogobius flavimanus, Pterogobius elapoides* |
| Locality | Karachi | Japan | Florida coast | Japan |
| Gender | Female | Female | Female | Female |
| Size of the body (mm) | (79.2-84.6) (0.68-0.72) | (82)(1.43) | (78-110)(0.4-0.7) | (81.6-129)(0.8-1.1) |
| Size of lip (mm) | (0.097-0.1008) (0.1152) | (0.12)(0.18) | (0.078-0.09)(0.06-0.07) | - |
| Size of the oesophagus (mm) | (1.027-1.08) (0.112-0.154) | (1.77)(0.15) | (1.09-1.43) | (0.7-1.25) |
| Size of the intestine (mm) | (75.6-79.2) (0.54-0.61) | - | - | - |
| Cephalic width (mm) | (0.126-0.154) | - | (0.109-0.19) | (0.2-0.24) |
| Caudal width (mm) | (0.168-0.182) | - | - | (0.23-0.29) |
| Nerve ring from anterior (mm) | - | (0.4) | (0.258-0.367) | (0.17-0.27) |
| Size of ventriculus (mm) | (0.07-0.084) | - | (0.03-0.04)(0.05-0.08) | (0.023-0.029) (0.051-0.081) |
| Size of the ligament (mm) | (3.24-3.6) | - | (0.47-1.2) | - |

(Moravec et al., 2019) and sub gravid specimen of *P. haemulontis* (Moravec et al., 2020). The cephalic width is wider than that of a sub-gravid specimen of *P. haemulontis* (Moravec et al., 2020), while the caudal width is narrower than that of the gravid specimen of *P. cryptocentri* (Yamaguti, 1961). The intestinal ligament is longer than that present in the gravid specimen of *P. haemulontis* (Moravec et al., 2020).

*3.3.3. Philometra kemarii (n.sp.) (Figure 3a-3d)*

Family: Philometridae (Baylis and Daubney, 1926)
Sub-family: Philometrinae (Baylis and Daubney, 1926)
Genus: *Philometra* (Costa, 1845)
Host: *Lutjanus argentimaculatus* (Forsskal, 1775)
Location: Karachi coast, Pakistan
Locality: Gonads (Ovary)
The number of specimens recovered: 26

*3.4. Diagnosis*

*3.4.1. Female characters*

The body of the recovered specimen is transparent whitish brown in colour, with a distant brown intestine. The cuticle is smooth. The anterior end is wider than the posterior end (see Figure 3a-3b). The caudal end is rounded, while the cephalic end is flattened. The body length of the recovered specimen is 162-165.6 mm and 14.5-15.25 mm wide. The anterior side of the oesophagus from bulbous inflation is 0.1008-0.112 mm long and possesses a diameter of 0.19-0.13 mm. The nerve ring encircling the oesophagus at 0.016-0.066 mm from the anterior extremity (Figure 3c). The posterior of the oesophagus is cylindrical and muscular 0.82-1.04 mm long, and 6-6.5 mm wide. The anterior end of the intestine is rounded, while the posterior end is joined with a ligament that measures 1.96-2.17 mm in length. The length of the intestine is 160.9-162 mm and 6-6.5 mm wide. Ovaries are observed in anterior and posterior regions. The uterus is filled with spherical eggs extended anteriorly to the nerve ring. The tail length, from where the intestine end to the posterior portion, is 1.368-1.476 mm in length (Figure 3d). The size of the Cephalic width and caudal width is almost the same measuring up to 0.196-0.224 mm. The caudal end is rounded without any caudal projection (as shown in Table 3).

**Male:** Unknown.

Etymology

The present specimen is identified as new species named *Philometra kemarii*. The given species name of the area of the host fish.

*3.4.2. Remarks*

Type-species: *Philometra sp.* is also recorded from many other fishes in different parts of the world. The present specimen is recovered from the gonads of host *Lutjanus argentimaculatus* (Forsskal, 1775) of Karachi coast, Pakistan. Other type species recorded are *P. synagridis* (Moravec et al., 2020), from *Lutjanus synagris* (Linnaeus) reported from off the Florida coast in the Gulf of Mexico and Straits of Florida, USA; *P. mexicana* (Moravec and Salgado-Maldonado, 2007) from *Epinephelus adscensionis* (Osbeck), reported from the coast of the Southern Gulf of Mexico.

The body size of the recovered species is larger than the gravid specimen of *P. synagridis* (Moravec et al., 2020) and smaller than the gravid specimen of *P. mexicana* (Moravec and Salgado-Maldonado, 2007). But broader than both.

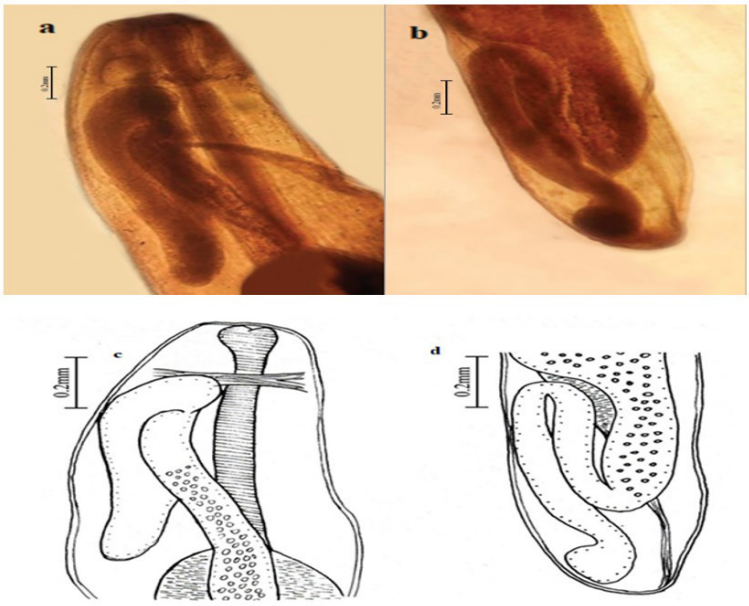


**Figure 3.** a: Anterior end of *Philometra kemarii* (n.sp.) (×10); b: Posterior end of *Philometra kemarii* (n.sp.) (×10); c: Drawing of the anterior end of *Philometra kemarii* (n.sp.) showing the oesophagus, nerve ring and ovary; d: Drawing of the posterior end of *Philometra kemarii* (n.sp.) showing the caudal region.

**Table 3.** Comparison of previously recorded species of genus *Philometra* (Costa, 1845) with *Philometra kemarii* (n.sp.).

| ***Philometra sp.*** | ***P. kemarii* (n.sp.)** | ***P. synagridis* (Moravec et al., 2020)** | ***P. mexicana* (Moravec and Salgado-Maldonado, 2007)** |
|---|---|---|---|
| Host | *Lutjanus argentimaculatus* | *Lutjanus synagris* | *Epinephelus adscensionis* |
| Locality | Karachi | Gulf of Mexico and Straits of Florida, USA | Gulf of Mexico |
| Gender | Female | Female | Female |
| Size of the body (mm) | (162-165.6)(14.5-15.25) | (152)(0.816) | (178-230)(0.7-1.3) |
| Size of lip (mm) | (0.1008-0.112)(0.13-0.19) | (0.163)(0.150) | (0.06-0.12)(0.12-0.15) |
| Size of the oesophagus (mm) | (0.82-1.04)(0.13-0.147) | - | (0.9-1.1)(0.12-0.147) |
| Size of the intestine (mm) | (160.9-162)(6-6.5) | - | - |
| Cephalic width (mm) | (0.196-0.224) | (0.272) | - |
| Caudal width (mm) | (0.196-0.224) | - | - |
| Nerve ring from anterior (mm) | (0.016-0.066) | (0.313) | (0.245-0.27) |
| Size of ventriculus (mm) | - | (0.041)(0.136) | (0.03-0.039)(0.06-0.09) |
| Size of the ligament (mm) | (1.96-2.17) | (0.933) | (0.612-1.02) |

The size of the anterior inflation of the oesophagus is larger than the gravid specimen of *P. mexicana* (Moravec and Salgado-Maldonado, 2007). The cephalic width of the present specimen is narrower than the gravid specimen of *P. synagridis* (Moravec et al., 2020). The nerve ring is located more closely to anterior inflation in present species than seen in the gravid specimen of *P. synagridis* (Moravec et al., 2020) and the gravid specimen of *P. mexicana* (Moravec and Salgado-Maldonado, 2007). The intestinal ligament is larger in size than that present in previously described species. Based on variation in characters, the diagnosed *Philometra* is a new specie named *Philometra kemarii.*

## 4. Discussion

From *Lutjanus argentimaculatus* (Forsskal, 1775), three new species were discovered, namely *P. kolaachii* (n.sp.),

*P. lutjani* (n.sp.) and *P. kemarii* (n.sp.). *P. kolaachii* (n.sp.) is compared with *P. carolinensis* (Moravec et al., 2006), *P. kiddakoi* (Moravec et al., 2019), and *P. cryptocentri* (Moravec et al., 2012). The body size of *P. kolaachii* (n.sp.) is larger than *P. kiddakoi* (Moravec et al., 2019) and *P. cryptocentri* (Moravec et al., 2012). The size of anterior inflation and length of the oesophagus is smaller than *P. carolinensis* (Moravec et al., 2006) and *P. kiddakoi* (Moravec et al., 2019). The nerve ring is located anteriorly on the oesophagus compared to *P. kiddakoi* (Moravec et al., 2019) and *P. cryptocentri* (Moravec et al., 2012). The size of the ventriculus of *P. kolaachii* (n.sp.) is greater than *Philometra cryptocentri* (Moravec et al., 2012). While the caudal width and intestinal ligament of *P. kolaachii* (n.sp.) are greater than *P. carolinensis* (Moravec et al., 2006). *Philometra lutjani* (n.sp.) is compared with *P. kiddakoi* (Moravec et al., 2019), *P. haemulontis* (Moravec et al., 2020), and *P. cryptocentri* (Yamaguti, 1961).

In comparison with *P. kiddakoi* (Moravec et al., 2019), the size of bulbous inflation and oesophagus is smaller, and the nerve ring is also nearer to the anterior side of the oesophagus. In comparison with *P. haemulontis* (Moravec et al., 2020) and *P. cryptocentri* (Yamaguti, 1961), it is observed that the size of the ventriculus is greater than both. The cephalic width is wider than *P. haemulontis* (Moravec et al., 2020), while the caudal width is narrower than *P. cryptocentri* (Yamaguti, 1961). Moreover, the intestinal ligament of *Philometra lutjani* (n.sp.) is more elongated than *P. haemulontis* (Moravec et al., 2020). *Philometra kemarii* (n.sp.) is compared with *P. synagridis* (Moravec et al., 2020) and *P. mexicana* (Moravec and Salgado-Maldonado, 2007). In comparison, it is observed that the body size of *P. kemarii* (n.sp.) is smaller than *P. mexicana* (Moravec and Salgado-Maldonado, 2007) but elongated than *P. synagridis* (Moravec et al., 2020). The size of the anterior inflation of the oesophagus is greater than *P. mexicana* (Moravec and Salgado-Maldonado, 2007). The cephalic width is narrower than *P. synagridis* (Moravec et al., 2020). The nerve ring is located anteriorly on the oesophagus compared to *P. synagridis* (Moravec et al., 2020) and *P. mexicana* (Moravec and Salgado-Maldonado, 2007). Ventriculus and intestinal ligament are also greater than both described species.

Helminths are frequently neglected as causative agent of fish diseases. Many fish farmers believe that these parasites are harmless and often used as food for several fish species (Paredes-Trujillo et al., 2016). However, under aquaculture conditions such as low water quality, high stocking density and extreme environmental variables (e.g. high ammonia concentration, high temperature etc.) these nematodes can cause disease [e.g. Gonzáles-Fernández (2012), Paredes-Trujillo et al. (2016)]. For an example of Latin America and Cribbean, helminths affected commercial aquaculture and caused serious economic losses (Soler-Jiménez et al., 2017). The spread and establishment of parasitic helminths may have detrimental health consequences when present in high numbers within a cultured population with deficient management practices and a lack of biosecurity plans. Therefore, future research could be addressed potential risks that helminths represent to farmed fish in Pakistan.

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