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Parasitic Infection Patterns of Marine Fishes Entered Shatt al-Arab River, Basrah, Iraq

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ABSTRACT
During a parasite examination of 31 fish species from 16 families, collected from three different stations in the Shatt al-Arab River between September 2023 and June 2024, 13 parasite species were identified. These included one protozoan (*Ichthyophonus* sp.) found in the internal organs of three fish species from two families, and six species of Myxozoa (from four genera). *Chloromyxum* and *Ellipsomyxa* were found in the kidneys and spleen, respectively, of *Planiliza subviridis*. *Myxobolus* was observed in the spleen, gill filaments, and intestinal walls of *P. subviridis*, while *Hennegoides* was found in the kidneys of *Acanthopagrus sheim*. Four trematode species were also recorded: *Erilepturus hamati* from the intestines of seven fish species across four families; *Fastuala basiri* Hafeezullah & Siddiqi, 1970; *F. gangetica* (Srivastava, 1935); and *Aphanurus* sp., all from the intestines of *Tenualosa ilisha* (the latter may be new to science). *Hysterothylacium* sp. type BC larvae were recorded in the intestines of two fish species, and *Echinocephalus* sp. type BB larvae were found in five fish species. The acanthocephalan *Neoechinorhynchus dimorphospinosus* Amin & Sey, 1996 was found in the intestines of two mullet species (*P. klunzingeri* and *P. subviridis*). A total of 14 marine fish species were found to be free of endoparasitic infections. The six myxozoan species and the trematode *Aphanurus* sp. were recorded for the first time in Iraq and the Arab Gulf. Additionally, 17 new host records were included in the study across four different fish hosts.

INTRODUCTION

The effort of investigation to describe or discover new parasites in piscine hosts are significant not just only to fill our understanding of biodiversity of aquatic ecosystem, but also to observe and reduce disease warning in aquaculture in light of global climate changes **(Poulin *et al*., 2020)**.

The diversity of myxozoans from Iraqi fishes includes 123 nominal myxozoan species (Three species from marine fishes and 122 species from freshwater fishes) belonging to eight genera: *Henneguya* Thélohan, 1892 (1 species), *Chloromyxum* Mingazzini, 1890 (4 species), *Myxidium* Bütschli, 1882 (5 species), *Myxobiliatus* Davis, 1944 (2 species), *Myxobolus* Bütschli, 1882 (105 species), *Kudoa* Meglitsch, 1947 (1 species), *Thelohanellus* Kudo, 1933 (4 species), and one species of *Unicauda* Davis, 1944 (**Mhaisen & Al-Jawda, 2020; Mhaisen, 2024)**.

The marine fish population and diversity in the Shatt al-Arab River greatly exceed that of freshwater fish, yet parasitological data on these species are scarce. Therefore, the present study aimed to fill this knowledge gap, particularly when marine fish enter the river for various reasons.

MATERIALS AND METHODS

For the parasitological examination, 792 fish specimens, representing 31 marine fish species, were collected from three different stations along the Shatt al-Arab River (Table 1): Al-Faddaqia (South station) at 30°46’80”N and 47°92’85”E, Qarmat Ali (Middle station) at 30°70’01”N and 47°75’25”E, and Al-Qurna (North station) at 30°00’54”N and 47°44’11”E. All fish were caught fresh and preserved in cool boxes with ice. In the laboratory, these fishes were classified according to **Carpenter *et al.* (1997)** and verified with **Fricke *et al.* (2024)**, and they were examined for parasites during 48 hours. The prevalence of infection and the mean intensity were calculated according to **Bush *et al*. (1997)**. The protozoans (e.g. *Ichthyophonus*) were prepared by taking a wet smear from each visceral organs of the fishes, then examined microscopically **(Storesund *et al*., 2022)**. The myxozoans were prepared either by breaking the trophozoite cysts, spreading the spores on a slide with a cover slip, and examining them directly under a high magnification lens, or by mounting the cyst liquid on glycerol jelly. The spores were then measured and photographed **(Molnár *et al*., 2006)**. The fixation, preparation, staining, and mounting of adults and metacercariae of trematodes followed the method of **Justine *et al.* (2012)**. Nematodes were fixed in hot 4-5% formalin, preserved in 70% ethanol, and cleared in glycerol **(Moravec, 1994)**. Acanthocephalans were stored in the refrigerator overnight, fixed in cold 70% ethanol **(Amin *et al*., 2018)**, stained with Mayer-Schuberg's Aceto carmine, cleared in methyl salicylate, and mounted in Canada balsam **(Palm, 2004)**. All measurements are in micrometers.

RESULTS AND DISCUSSION

Table (1) presents the parasites, hosts, prevalence and mean of intensity, which were recorded from marine fishes from the selected stations along Shatt Al-Arab River.

I: Kingdom Protozoa

Only *Ichthyophonus* sp. (family Ichthyophonidae, order Eccrenida, class Ichthyopsorea, phylum Choanozoa) was recorded from three fish species (Table 1). The liver, spleen, gall bladder, and kidneys of *P. subviridis* were infected during autumn, winter, and spring, with a prevalence of 23.86% in Qarmat Ali. In contrast, only the liver of *P. subviridis* was infected (4%) during spring in Qurna. The spleen of *P. klunzingeri* was infected (14.28%) during autumn in Qarmat Ali. The kidneys of *Tenualosa ilisha* were infected (1.25%) during autumn in Qurna, and the gall bladder was infected (2.85%) during spring in Qarmat Ali.

II: Phylum Cnidaria

Class Myxozoa

Six different species of myxozoans, belonging to four genera (*Chloromyxum*, *Ellipsomyxa, Hennegoides*, and *Myxobolus*), were detected in *P. subviridis* (eight myxozoan species) and *A. sheim* (one myxozoan species). *Chloromyxum* sp. and *Ellipsomyxa* sp. were found in the kidneys and spleen, respectively, with a prevalence of 0.82% during the winter at Faddaqia.

Hennegoides sp. (6.06%) was found in the kidneys of *A. sheim* during winter at Al-Faddaqia. Three species of *Myxobolus (Myxobolus* sp. 1, *Myxobolus* sp. 2, and *Myxobolus* sp. 3) were reported from *P. subviridis.*

Myxobolus sp. 1 was isolated from the spleen during winter at Al-Faddaqia (2.45%), Qarmat Ali (1.13%), and Qurna (4%). *Myxobolus* sp. 2 was found in the gill lamellae during spring at Al-Faddaqia (0.82%). *Myxobolus* sp. 3 was isolated from the intestinal wall during spring at Al-Faddaqia (2.45%) and Qarmat Ali (1.13%).

The following is a description of the newly recorded myxozoans from the current study.

Class Myxozoa

Order Bivalvulida

Family Chloromyxidae

***Chloromyxum* sp.** (Fig. 1)

The spores were found free in the smear of kidneys. Spores are pyriform, measuring 12µm in length and 7.4µm in width. The valvular surface was smooth with three or four distinct ridges parallel to the suture line. Four almost equal pyriform polar capsules, 5µm in length and 3µm in width, come together at the apical portion of spores.

Remarks

Class Myxozoa, belonging to the phylum Cnidaria, includes more than 2,600 described species **(Okamura *et al.*, 2018)**. *Chloromyxum Mingazzini, 1890* parasitizes both freshwater and marine bony and cartilaginous fishes, containing 150 valid species **(Lisnerová *et al*., 2024)**. The current species will be compared only with those that have caudal filamentous projections, specifically: *C. dogieli* Kovaljova, 1988; *C. kotorensis* Lubat, Radujkovic, Marques & Bouix, 1989; *C. lesteri* Gleeson and Adlard, 2012; *C. liae* Kuznetsova, 1977; *C. mingazzinii* Gleeson and Adlard, 2012; *C. multicostatum* Kuznetsova, 1977; *C. myliobati* Gleeson and Adlard, 2012; *C. ovatum* Jameson, 1929; *C. riorajum* Azevedo, Casal, Garcia, Matos, Teles-Grilo and Matos, 2009; *C. squali* Gleeson and Adlard, 2012; *C. striatellus* Kovaljova, 1988; *C. scyliorhinum* Noble, 1948; *C. tanakai* Fujita, 1936; and *C. transversocostatum* Kuznetsova, 1977.

Only *C. kotorensis* and *C. tanakai* will be compared with *Chloromyxum* sp. from *P. subviridis* (Table 2), as these species parasitize bony fishes. *Chloromyxum* sp. has larger spores and polar capsules compared to both *C. kotorensis* and *C. tanakai*. Additionally, there are differences in host species (*P. subviridis* vs. *L. aurata* and *Oncorhynchus keta*), site of infection (kidneys and gall bladder vs. kidneys), and geographical distribution

(Iraq vs. Montenegro and Japan). Therefore, the present myxozoan is considered an undescribed species and possibly a new species, pending the availability of additional specimens for molecular and ultrastructural studies.

In Iraq, only four *Chloromyxum* species so far recorded mainly from freshwater fishes; *Chloromyxum bychovskii* Shulman, 1962 from nine freshwater fishes; *Chloromyxum dubium* Auerbach, 1908 from *Acanthopagrus* sp. (reported as *A. latus*) by Hussain (2010); *C. leiosporum* Shul'man, 1962 and *Chloromyxum wardi* Kudo, 1920 from one and four freshwater fishes, respectively **(Mhaisen, 2024)**.

Family Ceratomyxidae

***Ellipsomyxa* sp. (Fig. 2)**

This myxozoan was found free in the smear of spleen. Spores are oval, with rounded ends, 11-12 (11.75) in length and 7-8 (7.75) in width. The Sutural line was hardly seen by formed curved line. Polar capsules two, equal and subglobular, 3.5-4 (3.8) in length and 2-3.5 (3.1) in width. Sporoplasm filling the entire cavity between the polar capsules.

Remarks

Ellipsomyxa Koi, 2003, is a ceratomyxid myxozoan parasite of marine (15 species) and freshwater fishes (5 species). There are only three species which infect gall bladder of mullets for comparison (Table 3); *Ellipsomyxa mugilis* (Sitja-Bobadilla & Alvarez-Pellitero, 1993) from *Mugil cephalus*; *M. capito* and *Liza saliens* (*Chelon saliens*) off Spain; *Ellipsomyxa kalthoumi* Thabet, Tlig-Zouari, Al Omar & Mansour, 2016 from *Liza saliens* (*Chelon saliens*) off Tunisia and *Ellipsomyxa gordeyi* Yurakhno, Ha, and Whipps, 2024 from *Mugil cephalus*, *Planiliza melinoptera*, *P. subviridis* and *Planiliza* sp. D. off Vietnam **(Sitjà-Bobadilla & Alvarez-Pellitero, 1993; Thabet *et al*., 2016; Yurakhno *et al*., 2024)**.

Ellipsomyxa sp. from *P. subviridis* off Iraq is very similar to *Ellipsomyxa mugilis* from three mullet species off spain in measurements of spores and polar capsules (Table 3), but the former species has polar capsules which occur relatively close to surface at opposite side vs polar capsules which occur very close to surface at opposite side as well as thick surface in Iraqi species vs thin surface in Spanish species and the site of infection (Spleen vs gall bladder). Although *P. subviridis* harbored *E. gordeyi* from Vietnam and *Ellipsomyxa* sp. from Iraq, but the former species has smaller spores length than that in *Ellipsomyxa* sp. as well as the variation in the site of infection (Spleen vs gall bladder) and geographical distribution (Iraq vs Vietnam). Accordingly, the present myxozoan is considered as undescribed species and possibly described as a new species in case available additional specimens for molecular and ultrastructure studies.

***Hennegoides* sp.** (Fig. 3)

This Myxozoan was isolated free from kidney smear of the spotted yellowfin seabream *Acanthopagrus sheim* during winter of Al-Faddaqia. The spores are sub spindle in shape with two very short caudal appendages, and with similar polar capsules of sub globular in shape. The spores range from 7-9 (8) in length and 3-4.5 (3.8) in width. The two polar capsules range from 3-4 (3.56) in length and 2.5-3.5 (2.95) in width. The length of the caudal appendages range from 10-13 (11.3). Iodinophilous vacuole conforms a small area from sarcoplasm. The ratio of spore length/caudal appendages length range from 0.61-0.85 (0.71). The total spores length range from 18.5-21 (19.5).

Remarks

Lom *et al.* (1991) defined the genus *Hennegoides* by its asymmetrical spores with nonaxially attached caudal appendages. The polar filament is anisofilar and wound longitudinally in the polar capsules, found in the intestine mucosa of gourami (*Anabatiformes*) off Thailand, and placed it in the family Myxoblidae (Lom & Dyková, 2006). **Molnár *et al.* (2006)** described three new species from the gills of *Pangasius hypophthalmus* (*Pangasianodon hypophthalmus*, *Pangasiidae*, *Siluriformes*) off Malaysia. **Wagner (2016)** assigned *Henneguya obpyroformis* Ma, Wang et Cai, 1986, isolated from the gills, spleen, and liver of two species of *Nemacheilus* (*Cypriniformes*) off China, to the genus *Hennegoides* as *Hennegoides obpyroformis* (Ma, Wang, & Cai, 1986).

Leis *et al.* (2019) described *H. fockae* from the gills of the pirate perch *Aphredoderus sayanus* (*Percopsiformes*) off the USA. **Nissa and Kaur (2021)** added *H. seenghalae* from the gills of the catfish *Sperata seenghala* (*Siluriformes*) off India.

The Iraqi specimens of *Hennegoides* sp. closely resemble *H. obpyroformis* in most morphological features (Table 4). However, the Iraqi specimens differ in spore length (7-9 µm vs. 9.6-10.4µm) and the ratio of spore length to caudal appendages (0.71 vs. 0.86), in addition to differences of the site of infection (kidneys vs. gills, spleen, liver) and geographical location (Iraq vs. China). Therefore, the present myxozoan is considered an undescribed species and may be a new species, pending the availability of additional specimens for molecular and ultrastructural studies.

Myxobolus sp. 1 (Fig. 4)

This parasite was found free in spleen smears. The spores are regularly globular with a slightly tapered anterior end. The polar capsules usually occupy half of the spore length. Spore length ranges from 7.4 to 7.5µm (mean: 7.46µm), and spore width ranges from 6.94 to 7.66µm (mean: 7.11µm). The pyriform polar capsules are equal in size, measuring 3.92-4.24µm in length and 3.38-3.58µm in width. The sporoplasm contains a single nucleolus.

Remarks

This myxozoan was recorded from the spleen of *P. subviridis* during winter at three stations. No *Myxobolus* species has been described or recorded from *Planiliza subviridis*, except *M. diversus* Nie and Li, 1973, which was recorded from the fins by **Jori (2007)** at Al-Hammar Marsh. However, *M. diversus* differs significantly in the shape of its asymmetrical polar capsules, which are larger than those of *Myxobolus* sp. 1 from the current study. Therefore, the comparison will be made only with species isolated from the spleens of mullets (Table 5).

The measurements of *Myxobolus* sp. 1 in the current study fall within the range of measurements for *M. muelleri*, which has been recorded from *Liza aurata*, *Liza sliens*, and *Liza ramada* in various countries across Eurasia. However, the wide range of spore measurements suggests that this could be a problematic or cryptic species, potentially comprising more than one species **(Rocha *et al.*, 2019)**.

The identification of this parasite at the species level requires further investigation, pending the availability of additional specimens for molecular and ultrastructural studies.

Myxobolus sp. 2 (Fig. 5)

The vegetative stages (plasmodia) consist of white filamentous cysts, measuring about 1-1.5mm (mean: 1.34mm) in length and 0.1-0.18mm (mean: 0.13mm) in width. The spores are oval, measuring 10-12µm (mean: 11.16µm) in length and 5.5-7µm (mean: 6.04µm) in width. The polar capsules are pyriform and equal in size, measuring 3.5-4µm (mean: 3.9µm) in length and 2-3µm (mean: 2.14µm) in width. The polar capsules usually occupy about 35% of the spore length. The sporoplasm contains two nuclei.

Remarks

This myxozoan was recorded from the gill lamellae of *P. subviridis* at Faddaqia during the spring. No *Myxobolus* species has been described or recorded from the gills of *Planiliza subviridis* so far. Around 50 *Myxobolus* species have been identified as parasites of mullets globally **(Özer *et al.*, 2016; Cardim *et al.*, 2018; Rocha *et al.*, 2019; Gupta *et al.*, 2022; Correya *et al*., 2023; Guimarães *et al*., 2023; Vieira *et al.*, 2024; Whipps *et al.*, 2024)**, with the majority affecting species of the genus *Mugil*. The following *Myxobolus* species are known to infect species from the genera *Liza*, *Planiliza*, and *Chelon*: *M. adeli* (Yurakhno & Ovcharenko, 2014); *M. anili* (Sarkar, 1989); *M. lizae* (Narasimhamurti & Kalavati, 1979); *M. macrolepi* (Padma Dorothy & Kalavati, 1992); *M. mugilis* (Pogorelceva, 1964); *M. parsi* (Das, 1996); *M. planilizae* (Correya, Pananghat & Karayi, 2022); and *M. sphaeralis* (Padma Dorothy & Kalavati, 1992) (Table 6). Only *M. parsi* and *M. sphaeralis* are known to parasitize the gills of *Liza parsia* and *Chelon macrolepis*, respectively.

Myxobolus sp. 2 from the gills of *P. subviridis* off Iraq is similar to *M. sphaeralis* from the gills of *C. macrolepis* off India. However, *Myxobolus* sp. 2 has smaller spore lengths and slightly larger polar capsule widths (10-12µm vs. 13-15µm, and 2-3µm vs. 1.1-2µm, respectively), in addition to differences in geographical distribution (Iraq vs. India).

The identification of this parasite at the species level also awaits further investigation, pending the acquisition of additional specimens for molecular and ultrastructural studies.

***Myxobolus* sp. 3** (Fig. 6)

The vegetative stages consist of a few oval white cysts, measuring 160-240µm (mean: 112µm) in diameter. The anterior part of the spore is markedly tapered, forming a well-developed intercapsular process. The spore is oval, measuring 6.5-7µm (mean: 6.25µm) in length and 4.5-5.5µm (mean: 4.63µm) in width. The polar capsules are pyriform and equal in size, measuring 3-4µm (mean: 3.78µm) in length and 1.5-2µm (mean: 1.75µm) in width. The spore thickness and polar filament length are 3µm and 12-30µm (mean: 20.6µm), respectively. The polar capsules typically occupy about half the length of the spore. The sporoplasm contains two nuclei.

Remarks

This myxozoan was recorded from the intestinal wall of *P. subviridis* at Faddaqia during the spring. No *Myxobolus* species have been described or recorded from the intestines of *Planiliza subviridis* in Iraq so far. The following six *Myxobolus* species have been described from the intestines of species from the *Liza* or *Planiliza* genera (Table 7): *M. adeli*, *M. anili*, *M. lizae*, *M. macrolepi*, *M. mugauratus*, and *M. planiliza*.

The current *Myxobolus* species is very similar in measurements to *M. macrolepi* (Table 7), but the two species differ in host species (*P. subviridis* vs. *P. macrolepis*), geographical distribution (Iraq vs. India), and site of infection (intestinal wall surface vs. intestine).

The identification of this parasite at the species level is pending further investigation, which will rely on the availability of additional specimens for molecular and ultrastructural studies.

Class: Trematoda

Order: Plagiorchiida

Family: Hemiuridae

***Erilepturus hamati* (Yamaguti, 1934) Manter, 1947**

This trematode has a wide range of fish hosts and is known by about 25 synonyms **(Bray, 1990)**. **Ali (2008)** first reported it in Iraq from three marine fish species: *Eleutheronema tetradactylum*, *Otolithes ruber*, and *Pseudorhombus arsius*. **Al-Salim and Jassim (2013)** documented the parasite from *Acanthopagrus arabicus* (reported as *A. latus*). In 2021, Al-Hajjaj added six new host species from Iraq: *Colletteichthys occidentalis*, *Epinephelus areolatus*, *E. bleekeri*, *Platycephalus indicus*, *Pseudosynanceia melanostigma*, and *Sparidentex hasta*. Since *Uterovesiculurus Skrjabin & Guschanskaja, 1954* is considered a synonym of *Erilepturus Woolcock, 1935* **(Gibson, 2002)**, the *Uterovesiculurus hamati* recorded by **Bannai (2002)** from *Otolithes ruber* should be attributed to *Erilepturus hamati*.

In the present study, new host records for *E. hamati* in Iraq include *Acanthopagrus sheim* (Sparidae), *Johnius belangeri*, *Johnius dussumieri*, *Johnius* sp. (all Sciaenidae), *Sillago sihama* (Sillaginidae), and *Scomberoides commersonnianus* (Carangidae), in addition to *Acanthopagrus arabicus* (Sparidae), which was previously recorded. Notably, this parasite appears to have a marine origin, as it was only recorded at Al-Faddaqia across all seasons.

***Aphanurus* sp.** (Fig. 7)

Description

Body small cylindrical, 569-1047 (763) in length; maximum width 150-192 (164) at ventral sucker level and 133-186 (146) at gonads. Ecsoma absent. Tegumental annulation faint on forebody only. Forebody short 100-179 (143). Forebody/Body length% 15.45-24.4 (19). Hind body 339-724 (477). Oral sucker globular with subterminal opening 51-76 (63) ×46-63 (57). Ventral sucker muscular, spherical, 112-156 (133) ×92-142 (115). Sucker ratio 1:1.7-2.3. Pharynx oblong 29-44 (35) ×32-38 (35). Oesophagus short. Caeca broad, reach near excretory vesicle. Testes subcircular, oblique. Anterior testis 34-44 (38) ×35-61 (46); Posterior testis 37-47 (40) ×36-47 (40). Seminal vesicle long, situated obliquely between ventral sucker and testes measuring 85-152 (103) ×29-57 (45). Pars prostatica joins base of sinus-sac at about level of anterior border of ventral sucker. Sinus-sac tubular, narrow. Hermaphroditic duct forming temporary sinus-organ. Genital pore, opened directly posterior to oral sucker. Ovary post-testicular, transverse-oval adjacent with posterior testis and cover the anterior margin of vitellarium 33-63 (49) ×45-76 (58). Vitellarium single, large compact 41-85 (63) ×55-103 (73). Vitellarium/Body length% 6.49-11.74 (8.59)%. Uterine coils distribute between posterior edge of ventral sucker and close to excretory vesicle posteriorly. Eggs numerous, thin-shelled, 17-21 ×8-11.5 (18.5 ×9.5). Egg/body length% 1.62-3.01 (2.57)%. Egg length/ovary width 0.3-0.4 (0.36). Excretory bladder Y-shaped; excretory pore terminal. Postviteline region 135-346 (219).

The genus *Aphanurus* Looss, 1907 includes intestine parasites of several families of mainly estuarine-marine teleosts **(Gibson, 2002)**, with 15 valid species **(Öztürk & Güven, 2023)**. Based on cuticle ornamentation, there are two different groups from *Aphanurus* species that can be isolated: the first group contains species with smooth tegument; *A. bailloni* Nagaty and Abdel-Aal, 1962; *A. caesionis* Yamaguti, 1952; *A. dorosomatis* Yamaguti, 1953; *A. dussumierii* Hussain, Hanumantha Rao and Shyamasundari, 1984 and *A. xiamenensis* Liu, 1995. The second group with plicated tegument: *A. harengulae* Yamaguti, 1938; *A. magniprotesticus* (Tang, Shi, & Pan, 1983); *A. microrchis* Chauhan, 1945; *A. mugilus* Tang, 1981; *A. multiprostcius* Pan, 1984; *A. orientalis* Liu, 1995; *A. stossichii* (Monticelli, 1891); *A. tuberculatus* Hafeezullah, 1981 and *A. virgula* Looss, 1907. Unfortunately, the tegument structure of both *A. balticus* Slusarski, 1957 is not known due to unavailable description (Table 8).

All *Aphanurus* species in the above second group, except *A. tuberculatus* differ from *Aphanurus* sp. of the present study by having completely plication of body. Furthermore, all the above seven species, except *A. harengulae* and *A. magniprotesticus* have median or smaller seminal vesicle and no conflict with ventral sucker. *Aphanurus* sp. described from *T. ilisha* of the present work has tegumental plication on forebody only, so, accordingly it is related to species of second group. *Aphanurus* sp. is very similar in comparison with *A. tuberculatus* from *Hilsa sinensis* (*Tenualosa reevesi*) and

Sardinella fimbriata (both Dorosomatidae) from India. However, the latter species has smaller eggs, 14-18×8 vs 17-19.7 ×8.5-11.5; slightly different sucker ratio 1:2.25 vs 1:1.7-2.3 and the position of base of sinus sac is at the anterior quarter of ventral sucker vs in middle part of ventral sucker.

Tang *et al.* (1983) created a new genus *Neoaphanurus* Tang, Shi and Pan, 1983 and described *N. magniprotesticus* based on a single specimen from *Coilia mystus* (L.) (Engrualidae), based on 1- single compact vitellarium, 2-Parsprostatica large, surround with large prostatic gland cells enclosed with single membrane, 3-large tubular seminal vesicle coils occupying large portion of posterior one third of the body. **Liu *et al*. (2010)** transferred the latter species to *Aphanurus* and considered the characters of the genus *Neoaphanurus* conflict with some species of *Aphanurus*.

Aphanurus magniprotesticus differs from *Aphanurus* sp. from *T. ilisha* in several key features: the position of the ventral sucker, with *A. magniprotesticus* having the ventral sucker aligned with the oral sucker in the anterior one-fourth of the body, while in Aphanurus sp. from *T. ilisha*, the ventral sucker is located in the anterior second-fourth of the body; in *A. magniprotesticus*, the anterior testis is larger than the vitellarium, whereas in *Aphanurus* sp. from *T. ilisha*, the vitellarium is larger than the testes; and finally, *A. magniprotesticus* has annulation throughout its entire body, while *Aphanurus* sp. from *T. ilisha* has annulation only on the forebody.

Although the present *Aphanurus* sp. may represent an undescribed species, its formal description as a new species is reserved for future consideration, as the description of *Aphanurus balticus* from *Salmo salar* (Salmonidae) has not been found for comparison.

Family Faustulidae

***Faustula basiri* Hafeezullah and Siddiqi, 1970**

Al-Daraji (2004) described *Faustula rahemii* based on specimens isolated from intestine of *Tenualosa ilisha* from marine waters off Iraq. Unfortunately, the author did not compare his specimens with at least 10 other species of *Faustula* that currently infect the same host in the western Indopacific region **(Mhaisen *et al*., 2018)**. Hence, that species is considered invalid **(WoRMS, 2024)**. Only *Faustula* sp. existed in the subsequent two reports related to parasites of *T. ilisha* from Shat Al-Arab River and the estuary **(Mhaisen *et al.*, 2018)**.

Dronen *et al*. (2021) reviewed all species of *Faustula* Poche, 1926, the majority of which parasitize *Tenualosa ilisha*, and established five new genera while also listing a number of synonyms. Specifically, *Faustula hilsai* (Rizvi, 1971) and *Faustula rahemii* (Al-Daraji, 2004) were considered synonyms of *Faustula basiri*. This revision reduced the number of *Faustula* species to five: *F. basiri*, *F. brevichrus* (Srivastava, 1935), *F. clupeae* (Srivastava, 1935), *F. gigantica* (Srivastava, 1935), and *F. keksooni* (MacCallum, 1918). The authors proposed a key for both the species of *Faustula* and the genera within Faustulidae.

Al-Daraji (2004) identified *F. rahemii* as distinct from other *Faustula* species by the position of the cirrus sac, which is anterior to the ventral sucker. However, **Dronen *et al.* (2021)** pointed out that three *Faustula* species share this character: *F. basiri*, *F. hilsai*, and *F. clupeae*. In their comparative analysis, the authors found no significant differences between *F. rahemii* and *F. basiri*, except for a slight variation in the position of the genital pore relative to the intestine bifurcation. This minor variation was attributed to the pressure exerted on the delicate parasite during slide preparation, which can shift the position of the genital pore. A similar case was observed in the misidentification of the species in *Uvitellina iraquensis* Dronen, Ali, and Al-Amura, 2013, a cyclocoelid trematode parasite of the white-tailed lapwing (*Vanellus leucurus*), where variations in the dislodging of the genital pore and other diagnostic features were linked to slide compression **(Dronen *et al*., 2017)**.

This particular parasite has been commonly reported in Al-Faddaqia and Qarmat Ali during spring and autumn, showing a fairly consistent prevalence in both regions. In contrast, it has been found in Qurna during winter and autumn, though with a lower prevalence.

***Faustula gangetica* (Srivastava, 1935) Yamaguti, 1958**

This parasite was firstly described as *Orientophorus gangetica* Srivastava, 1935 from intestine of *Clupea ilisha* (*Tenualosa ilisha*) from the Ganges River, India **(Srivastava, 1935)**. **Yamaguti (1958)** made a new combination and assigned it to *Faustula* **(Dronen *et al*., 2021)**. **Hafeezullah and Siddiqi (1970)** detected *Faustula gangetica* from the kelee had, *Hilsa kelee*, in Mumbai, India. **Madhavi and Bray (2018)** prepared a key for eight genera of Faustulidae of fishes in Indian subcontinent. *Faustula* species have genital pore median or submedian, testes and ovary in hindbody and multi-lobed ovary. **Madhavi and Bray (2018)** differentiated *F. gangatica* from *F. basiri* by extension of cirrus sac (beyond ventral sucker vs between caeacal bifurcation and anterior margin of ventral sucker) and distribution of vitellaria (between mid of oesophagus till posterior margin of ovary vs intestinal bifurcation till ovary level. **Garner *et al*. (2019)** redescribed and added supplementary information on cirrus sac and other morphometrics of *F. gangetica* based on specimens from *T. ilisha* from marine water of Iraq and designed *Faustula ilishii* (Srivastava, 1935) as a synonym with *F. gangetica*.

The occurrence *F. gangetica* is very rare in the current study and arised only from two specimens of the host during spring at Qarmat Ali and two specimens of the host during spring at Qurna. According to the last result, it is possible that these worms are of freshwater origin and that fishes are infected with them during their first life cycle in the river (Qarmat Ali and Qurna). The current opinion is supported by the original description of the species from the river Ganges River, India. Although **Garner *et al*. (2019)** studied the parasite from host lived in the sea (Arab Gulf), the hilsa shad *T. ilisha* is known to spend most of its live history in the marine water **(Freyhof *et al.*, 2021)**.

Phylum Nematoda

Class Chromatoidea

Order Rhabditida

Family Raphidascaridae

***Hysterothylacium* sp. type BC larva**

Larvae of this nematode are recorded from body cavity of both *Acanthopagrus sheim* (Sparidae) and *Johnius belangerii* (Sciaenidae). Both of these marine fishes are carnivorous on crabs, shrimps and mollusks which might be intermediate or paratenic hosts for *Hysterothylacium*. This type is a very common parasite in eight marine teloests and one shark species **(Mhaisen *et al*., 2018)**. **Ali and Mizher (2023)** added 15 new host records for these nematode larvae, all of them are carnivores. The record of *A. sheim* and *J*. *belangerii* here is considered as new host records for Iraq and the Arab Gulf.

Family Gnathostomatidae

***Echinocephalus* sp. Type BB larvae**

The current nematode larvae were isolated from seven marine fishes belonging to six families (Dorosomatidae, Engrualidae, Sparidae, Nemipteridae, Sciaenidae, and Mugilidae). All the infections were recorded at Al-Faddaqia, except for one infection from Qarmat Ali in *T. whiteheadi* and *P. subviridis*. The main site of infection was the intestine, with two exceptions: one infection occurred in the liver of *T. whiteheadi* from Qarmat Ali during winter, and another affected the liver, kidneys, and intestine of *N. nasus* from Al-Faddaqia across all three seasons. All seven fish species hosting *Echinocephalus* sp. larvae are carnivorous, except for *N. nasus*, which is planktivorous, indicating that they have a wide range of intermediate or paratenic hosts, including microcrustaceans, large invertebrates, and fish, as potential hosts for this nematode larvae. According to the studies of **Moravec and Justine (2006)** and **Ali and Al-Salim (2013)**, the minute spine rows, located below the main large buccal spines, are the only consistent character for distinguishing between different *Echinocephalus* species at the larval stage. **Ali and Al-Salim (2013)** previously isolated these larvae from the mesenteries of *Cynoglossus arel* and *Chiloscyllium arabicum* in marine waters of Iraq. **Al-Hajjaj (2021)** added three new hosts: *Rhabdosargus haffara*, *S. hasta* (both Sparidae), and *Trypauchen vagina* (Gobiidae) for *Echinocephalus* sp. Type BB larvae. In this study, all the fish species except *S. hasta* are considered new host records for *Echinocephalus* sp. Type BB larvae in Iraq (Table 1).

Phylum Acanthocephala
Class Eoacanthocephala
Order Neoechinorhynchida
Family Neoechinorhynchidae

***Neoechinorhynchus* (*Neoechinorhynchus*) *dimorphospinus* Amin and Sey, 1996**

This worm was recorded from two species of mullets: *P. klunzingeri* from Al-Faddaqia during autumn and from Qurna during spring, and from *P. subviridis* from Qarmat Ali during winter and from Qurna during spring. *N. (N.) dimorphospinus* was originally described from four different families of marine fishes off Kuwait **(Amin & Sey, 1996)**. **Bannai (2002)** reported it from *P. subviridis* at Khor Abdullah, Iraq. **Amin *et al.* (2015)** also reported this worm from *P. klunzingeri* at the mouth of the Shatt al-Arab River and added a new character using SEM techniques, along with studying its pathological effects on the intestine of mullets.

The current record of *N. (N.) dimorphospinus* from the Qarmat Ali and Qurna stations could potentially serve as a biological indicator for the migration of these two mullet species from marine to freshwater environments in the northern part of the Shatt al-Arab River. However, the low prevalence of infection in all these cases does not yet support this idea.

Table 1. The parasite fauna of marine fishes in three station along Shatt al-Arab River, site of infection, prevalence, mean of intensity and season

The parasite	host	Site	No. examined fish	No. infected fish	Prevalence	Mean of intensity	Station	Season
Ichthyophonus sp.	*Planiliza subviridis*#	Liver, spleen, gall bladder, Kidney	88	21	23.86	-	Qarmat Ali	Autumn Winter Spring
		Liver	25	1	4	-	Qurna	Spring
	P. klunzingeri#	spleen	14	2	14.28	-	Qarmat Ali	Autumn
	Tenualosa ilisha#	Kidney	80	1	1.25	-	Qurna	Autumn
		Gall bladder	65	1	2.85	-	Qarmat Ali	Spring
Chloromyxum sp. *	*P. subviridis*	Kidney	122	1	0.82	-	Faddaqia	Winter
Ellipsomyxa sp. *	*P. subviridis*	spleen	122	1	0.82	-	Faddaqia	Winter
Hennegoides sp. *	*Acathopagrus sheim*	Kidney	33	2	6.06	-	Faddaqia	Winter
Myxobolus sp. 1*	*P. subviridis*	spleen	122	3	2.45	-	Faddaqia	Winter
Myxobolus sp. 1*	*P. subviridis*	spleen	88	1	1.13	-	Qarmat Ali	Winter
Myxobolus sp. 1*	*P. subviridis*	spleen	25	1	4	-	Qurna	Winter
Myxobolus sp. 2*	*P. subviridis*	Gill lamellae	122	1	0.82	-	Fadaqia	Spring
Myxobolus sp. 3*	*P. subviridis*	Intestine wall	122	3	2.45	-	Faddaqia	Spring
Myxobolus sp. 3*	*P. subviridis*	Intestine wall	88	1	1.13	-	Qarmat Ali	Spring
Erilepturus hamati	*A. arabicus*	Intestine	14	1	7.14	1	Faddaqia	Autumn
	A. sheim#	Intestine	33	2	6.06	4	Faddaqia	Autumn
	Johnius belangerii#	Intestine	20	2	10	5.5	Faddaqia	Winter
	Johnius dussumieri#	Intestine	18	7	38.88	2.28	Faddaqia	Autumn
	Johnius sp.#	Intestine	8	4	50	9.5	Faddaqia	Spring
	Sillago arabica#	Intestine	4	1	25	1	Faddaqia	Autumn
	Scomberoides commersonnianus#	Intestine	6	1	16.66	1	Faddaqia	Autumn
Aphanurus sp. *	*T. ilisha*	Intestine	42	2	4.8	3.5	Faddaqia	Spring
Faustula basiri	*T. ilisha*	Intestine	42	9	21.4	86.55	Faddaqia	Autumn Spring
			65	16	24.61	7.37	Qarmat Ali	Autumn Spring
			80	7	11.42	21.22	Qurna	Winter Spring

Faustula gangetica	*T. ilisha*	Intestine	65	2	3.06	9.5	Qarmat Ali	Spring
			80	2	2.5	3	Qurna	Spring
Metacercaria type 1	*T. ilisha*	Gall bladder	65	1	1.35	1	Qarmat Ali	Spring
	A. sheim	Kidney	33	1	3.03	1	Faddaqia	Spring
	N. nasus	Liver	35	1	2.85	1	Faddaqia	Winter
	P. subviridis	Liver	25	1	4	3	Qurna	Autumn Winter
		Kidney, Liver, Heart	122	6	4.91	1.5	Faddaqia	Winter
		Kidney	88	1	11.36	3	Qarmat Ali	Winter
Strigeid Metacercaria type 2	*S. sihama*	Liver	27	2	7.4	1	Faddaqia	Spring
Echinocephalus sp. BB larva	*N. nasus*#	Intestine, Kidney, Liver	35	9	25.71	1.5	Faddaqia	Autumn Winter Spring
	Thrissina whiteheadi#	Liver	50	1	2	1	Qarmat Ali	Winter
	A. sheim#	Intestine	33	5	15.15	16	Faddaqia	Autumn Winter
	Sparidentix hasta	Intestine	1	1	100	1	Faddaqia	Autumn
	N. japonicus#	Intestine	4	1	25	2	Faddaqia	Autumn
	J. belangerii#	Intestine	20	1	25	12	Faddaqia	Autumn Winter
	P. subviridis#	Intestine	122	1	0.81	1	Faddaqia	Winter
		Intestine	88	2	22.72	4	Qarmat Ali	Winter
Hysterothylcium sp. Type BC larva	*A. sheim*#	Intestine	33	5	15.5	2	Faddaqia	Winter
	J. belangerii#	Intestine	20	4	30.73	1	Faddaqia	Autumn Winter
Neoechinorhynchus (*N.*) *dimorphospinus*	*P. klunzingeri*	Intestine	9	1	11.11	2	Faddaqia	Autumn
		Intestine	2	2	100	5	Qurna	Spring
	P. subviridis	Intestine	88	7	7.95	3.57	Qarmat Ali	Winter
		Intestine	25	1	4	2	Qurna	Spring

*New parasite record in Iraq and Arabian Gulf, # New host record in Iraq and Arabian Gulf.

Table 2. Comparison of *Chloromyxum* sp. with closely related species, which have caudal filamentous projections and parasitic on bony fishes

Species	Spore (Length×Width)	Polar capsule	Type host	Organ	Locality
C. kotorensis	8.7 (8–9.2) ×8.7 (8–9.2)	3.7 × 2.5	*Liza aurata* (= *Chelon auratus*)	Kidney	Montenegro
C. tanakai	9.3× 9.3 × 8.5	1.5	*Oncorhynchus keta*	Gall bladder	Japan
Chloromyxum sp.	12×7.4	5×3	*Planiliza subviridis*	Kidney	Iraq

Table 3. Comparison of *Ellipsomyxa* sp. measurements from *Planiliza subviridis* with related species parasitic on mullets

Species	Spore (Length ×Width)	Polar capsule (Length ×Width)	Type host	Organ	Locality
E. kalthoumi	13–21 (17.2)× 10–15 (13.2)	5–6 (5.5)× 5–6 (5.5)	*Liza saliens* (=*Chelon saliens)*	Gall bladder	Tunisia
E. mugilis	10–13.5 (11.5) ×5.6-9 (7.3)	2.7–4(2.9)×2.7–4 (2.9)	*Mugil cephalus*, *M. capito*, *Liza saliens* (=*Chelon saliens*)	Gall bladder	Spain
E. gordeyi	8.7–10.9 (9.5) × 6.2–8.1 (7)	2.7–4.3 (3.5) ×2.0–2.7 (2.4)	*Mugil cephalus*, *Planiliza melinoptera*, *P. subviridis* and *Planiliza* sp. D.	Gall bladder	Vietnam
Ellipsomyxa sp.	11–12 (11.75) ×7-8 (7.75)	3.5-4 (3.8)× 2-3.5 (3.1)	*P. subviridis*	Spleen	Iraq

Table 4. Comparative measurements of *Hennegoides* species

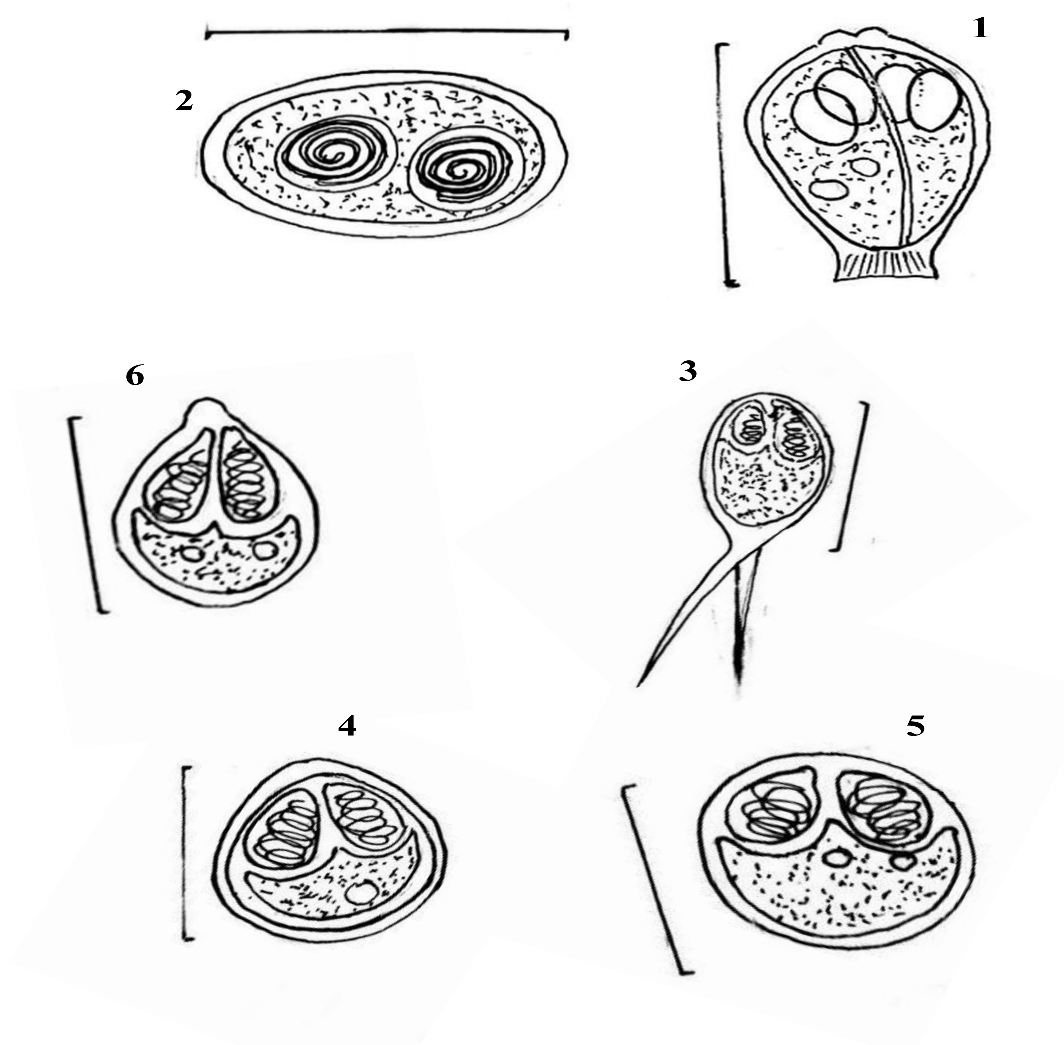
Species	***H. obpyriformis***	***H. longitudinalis***	***H. berlandi***	***H. malayensis***	***H. pangasi***	***H. flockae***	***H. seenghalae***	***Hennegoides* sp.**
Host	Cypriniformes	Anabatiformes	Siluriformes	Siluriformes	Siluriformes	Percopsiformes	Siluriformes	Acanthuriformes
Organ	Gills, spleen, liver	Intestine mucosa	gills	gills	gills	gills	gills	Kidney
Locality	China	Thailand	Malaysia	Malaysia	Malaysia	USA	India	Shat Al-Arab River, Iraq
Reference	**(Ma *et al*., 1986)**	**(Lom *et al*., 1991)**	**(Molnár *et al*., 2006)**	**(Molnár *et al*., 2006)**	**(Molnár *et al*., 2006)**	**(Leis *et al*., 2019)**	**(Nissa & Kaur, 2021)**	Present study
Total spore length	20-24.8 (22)	-	-	-	-	35.4-46.4 (41.3)	46.6	18.5-21 (19.5)
Spore length (SL)	9.6-10.4 (10.2)	10.9-12.2 (11.5)	8-9 (8.5)	12.5-14.4 (13.7)	24-30 (27)	15..4-17.8 (17)	7.5	7-9 (8)
Spore width	6.4-6.8 (6.5)	4.7-6.3 (5.4)	2.5-3 (2.8)	6.4-7.5 (6.83)	12-13.8 (12.6)	7.1-8.7 (7.9)	3-4.5 (3.8)	5.5-7 (5.83)
Polar capsule Length	4-4.4 (4.1); 3.2-3.6 (3.4)	4.3-5.7 (5.2)	2.5-3 (2.8)	5.7-6.3 (5.95); 5.1-6.2 (5.66)	14.4-15 (13.9); 10-12.2 (11.5)	6.5-8.5 (7.6); 5.6-7.7 (5.6)	1.5	3-4 (3.56)
Polar capsule Weight	1.6-2.4 (2.2); 1.6-2.4 (2.2)	1.7-2.2 (2.1)	1.5-2 (1.84)	3.1-3.5 (3.3); 3-3.3 (3.1)	6-7.2 (6.5); 4.8-6 (5.1)	3-3.9 (3.3); 2.6-3.2 (2.9)	0.75	2.5-3.5 (2.95)
Caudal process Length (CP)	10.4-14.4 (11.8)	3.4-6.8 (5.3)	40-50 (43.6)	36-40.5 (39.1)	48-72 (64.5)	17.5-31.8 (24.5)	27-47 (39.1)	10-13 (11.3)
Ratio SL: CP	0.86	2.16	0.19	0.35	0.41	0.69	0.19	0.61-0.85 (0.71)

Table 5. Comparative measurement of *Myxobolus* species recorded from spleen of mullets

Species	**Spore length**	**Spore width**	**Polar capsule length**	**Polar capsule width**
M. bramae	10-12	8-10	4.5-6.5	2.3-3.5
M. branchialis	7-11 (reach 12)	7-11 (reach 12)	2.5-3.5	2-3
M. exiguus	8-12	6-9.3	4-7	2.5-2.7
M. muelleri	6-14.5	7-12	4-7.5	2.5-3
M. platanus	10-11(10.7)	10-11 (10.8)	7-8 (7.7)	3.5-4 (3.8)
M. spinacurvatura	8.9-11.5 (9.97)	7.1-9.2 (8.56)	3.8-5.1 (4.24)	2.3-2.9 (2.78)
Myxobolus sp. 1	7.4-7.5 (7.46)	6.94-7.66 (7.11)	3.92-4.24 (4.07)	3.38-3.58 (3.54)

Table 6. Comparative measurement of *Myxobolus* spp. recorded from gills of mullets with *Myxobolus* sp. 2 from gill filaments of *Planiliza subviridis*

Species	Spore length	Spore width	Polar capsule length	Polar capsule width	Host	Country
M. parsi	9-9.5 (9)	8-8.5 (8.1)	4-5 (4.4)	2.5-3 (2.8)	*Liza parsia*	India
M. sphaeralis	13-15 (14.1)	6.5-8 (7.8)	4-4.9 (4.5)	1.1-2 (1.8)	*Chelon macrolepis*	India
Myxobolus sp. 2	10-12 (11.16)	5.5-7 (6.04)	3.5-4 (3.9)	2-3 (2.14)	*P. subviridis*	Iraq



Figs. (1-6). Myxosporeans from fishes of Shatt al-Arab River. Fig. (1): *Chroromyxum* sp.; Fig. (2): *Ellipsomyxum* sp.; Fig. (3): *Hennogoides* sp.; Fig. (4): *Myxobolus* sp. 1; Fig.(5): *Myxobolus* sp. 2; Fig.(6): *Myxobolus* sp. 3 (Scale bars: 12μ in Figs. (1 and 2); 9μ in figure 3; 7μm in figures 4 and 6; 10μm in Fig. (5).

Table 7. Comparative measurement of *Myxobolus* spp. recorded from intestine of mullets

Species	Spore length	Spore width	Polar capsule length	Polar capsule width	Thickness	Polar filament	Host	Country
M. adeli	5.56-7.75 (6.2)	6.57-7.66 (7.2)	2.36-3.8 (3)	1.26-2.28 (1.80)	3.55-5.27 (4.6)	-	*L. aurata*	Spain and Ukraine
M. anili	9.8-11.06 (10.7)	7.9-9.8 (8.6)	4.7-5 (4.8)	2.4-3.1 (3)	-	-	*L. macrolepis*	India
M. lizae	9-9.5	4.6-5.2	3.2	2	-	-	*L. macrolepis*	India
M. macrolepi	5.2-6.9 (6.3)	4.3-6.9 (5.3)	1.7-3.4 (2.8)	1.7-2.58 (2)	-	-	*L. macrolepis*	India
M. mugauratus	6.5	5	4	3	-	-	*L. aurata*	Ukraine
M. planiliza	7.45-8.75 (8.4)	6.04-6.86 (6.25)	3.96-4.54 (4.45)	2.22-2.94 (2.52)	-	-	*P. macrolepis*	India
Myxobolus sp. 3	6.5-7 (7.25)	4.5-5.5 (5.63)	3-4 (3.78)	1.5-2 (1.75)	3	12-30 (20.6)	*P. subviridis*	Iraq

Table 8. *Aphanurus* species-host list, host family and the reference related

Species	Host	Family	Reference
A. bailloni Nagaty & Abdel-Aal, 1962	*Tracinotus bailloni* (reported as *Trachynotus bailloni*)	Carangidae	**(Nagaty & Abdel Aal, 1962)**
Aphanurus balticus Slusarski, 1957	*Salmo salar*	Salmonidae	**(Slusarski, 1957)**
Aphanurus caesionis Yamaguti, 1952	*Caesio kuning*	Caesionidae	**(Yamaguti, 1952)**
Aphanurus dorosomatis Yamaguti, 1953	*Dorosoma chacunda* (=*Anodontostoma chacunda*)	Dorosomatidae	**(Yamaguti, 1953)**
A. dussumierii Hussain, Hanumantha Rao & Shyamasundari, 1984	*Dussumieria hasseltii*	Dussumieriidae	**(Madhavi & Bray, 2018)**
A. harengulae Yamaguti, 1938	*Clupea clupeoides* (=*Amblygaster clupeoides*), *Mugil cephalus*; *Valamugil cunnesius*	Dorosomatidae Mugilidae	**Yamaguti, 1938 (Madhavi & Bray, 2018)**
A. magniprotesticus (Tang, Shi & Pan, 1983) Liu *et al*., 2010	*Coilia mystus*	Engraulidae	**(Tang *et al*., 1983)**
A. microrchis Chauhan, 1945	*Mugil parsia* (*Planiliza parsia*)	Mugilidae	**(Chauhan, 1953)**
A. mugilus Tang, 1981	*Mugil cephalus*	Mugilidae	**(Tang, 1981)**
A. multiprostcius Pan, 1984	*Coilia grayii*	Engraulidae	**(Pan, 1984)**
A. orientalis Liu, 1995	*Glossogobius olivaceus*	Gobiidae	**(Liu, 1995)**
A. stossichii (Monticelli, 1891) Looss, 1907	*Konosirus punctatus*	Dorosomatidae	**(Tang *et al*., 1983)**
	Epinephelus akaara	Epinephelidae	**(Wang, 1982)**
	Boops boops	Sparidae	**(Kostadinova *et al*., 2004)**
	Sardina pilchardus	Clupeidae	**(Marzoug *et al*., 2012)**
	Tenualosa ilisha	Dorosomatidae	**(Madhavi & Bray, 2018)**
	Clupea fimbriata (=*Ethmalosa fimbriata*)	Dorosomatidae	**(Madhavi & Bray, 2018)**
	Hilsa toli	Dorosomatidae	**(Madhavi & Bray, 2018)**
	Ilisha elongate	Pristigasteridae	**(Madhavi & Bray, 2018)**

Aphanurus tuberculatus Hafeezullah, 1981	*Hilsa sinensis (=T. reevesii*)	Dorosomatidae	**(Madhavi & Bray, 2018)**
	Sardinella fimbriata	Dorosomatidae	**(Madhavi & Bray, 2018)**
Aphanurus virgula Looss, 1907	*Sardina pilchardus*	Clupeidae	**(Kostadinova *et al*., 2004)**
	Engraulis encrasicolus	Engraulidae	**(Kostadinova *et al*., 2004)**
A. xiamenensis Liu, 1995	*Konosirus punctatus*	Dorosomatidae	**(Liu, 1995)**
Aphanurus sp.	*Tenualosa ilisha*	Dorosomatidae	Present study

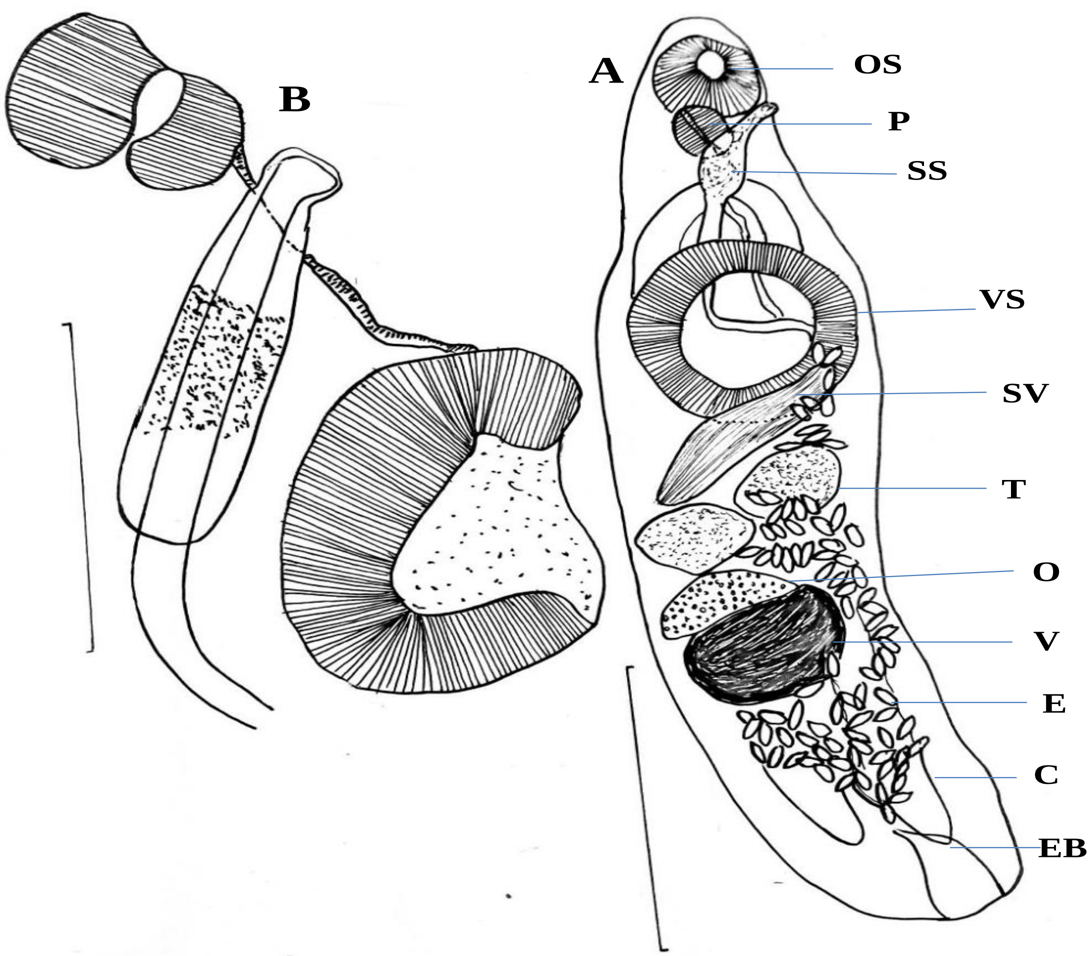


Fig. 7. *Aphanurus* sp. from intestine of *Tenulaosa ilisha*; A- ventral view; B- lateral view of forebody. Scale bar: A= 190µm; B=77µm. Abberiviations: C: Caecum; E: egg; O: Ovary; OS: Oral sucker; P: Pharynx; SS: Sinus sac; SV: Seminal vescicle; T: Testis; V: Vitellarium; EB: Excretory ladder; VS: Ventral sucker. Scale bar: A=190µm; B=77µm.

CONCLUSION

Although the present parasitological investigation examined 31 marine fish species, only 15 of them were found to be infected with endoparasites (including one ectoparasite). *Planiliza subviridis* exhibited the highest parasite richness, hosting five species of myxozoans, along with one species each of protozoan, trematode, nematode, and acanthocephalan. *Acanthopagrus sheim* had one myxozoan species and two species each of trematodes and nematodes, while *Tenualosa ilisha* was infected with five parasite species, including one protozoan and four trematodes. The remaining infected fish species hosted between one and three parasite species each.

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