



(REVIEW ARTICLE)



Review of fish endoparasites in Tigris River, Iraq

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Abstract

Fish, like other living organisms, are susceptible to infection with a variety of parasites. Fish is almost not free of parasites, as internal and external parasites. Parasites are organisms of great importance because of their different types and multiple life cycles, they are used as evidence of environmental pollution, and the life of the host. This study dealt with the database of studies of fish parasites in Iraq. Which includes the following classes of parasites: Nematodes as *Rhabdochona* sp., *Anisakis* sp., Monogenic as *Cichlidogyrus sclerosus*, *Dactylogyrus anchorayus*, *Discocotyle sagittata*, *Dactylogyrus arcuatus*, *Dactylogyrus extensus*, *Dactylogyrus simplex*, *Dactylogyrus Gussevi*, *Dactylogyrus inexpectatus*. Ciliates as *Trichodina cottidarum*. Digenea as *Allocreadium markewitschi*, *Centrocestus formosanus*, *Asymphylostrema macracetabulum*, *Asymphylogora markewitschi*.

Keywords: *Chondrostoma regium*; *Dactylogyrus elegantis*; *Dactylogyrus deziensis*; *Trichodina cottidarum*; Iraq

1. Introduction

Fresh water is an important resource for life, so we must preserve it to contain living things [1]. One of these organisms is fish because it is considered a nutritional and economic source. It is important to participate in providing food security for the country

[2]. Nutritional problems or environmental problems play a role in causing many fish diseases, including parasitic, bacterial, viral, or fungal diseases [3]. Fish, like other living organisms, are susceptible to infection with a variety of parasites. Fish is almost not free of parasites, as internal and external parasites are present and may cause huge losses in fish, causing deaths and having a significant impact on fish growth [4]. Parasites are organisms of great importance because of their different types and multiple life cycles, they are used as evidence of environmental pollution, and the life of the host [5,6]. Recently, researcher became interested in the pollution of the aquatic environment, and this was the focus of attention and interest of many of them [7].

1.1. *Chondrostoma regium* (Heckei, 1843)

Chondrostoma regium was found in the Tigris, Euphrates rivers, Lakes and southern Turkey. It is an omnivorous fish. Its food on larvae and fish eggs, and also feeds on algae and aquatic plants. This species is infected with many parasites, including protozoa, trematoda, cestoda tapeworms, nematoda worms, and acanthocephala, and crustacean. [8] they collected 200 specimens from the Khazir River passing through Nineveh Governorate belonging to seven species of fish, they found the *C. regium* was infected with two types of nematodes, and they was a new recording in Iraq *Rhabdochona* sp. Larva, *Anisakis* sp. Larva. [9] mentioned *C. regium* was infected with a species of Zoospores *Chloromyxum wardi* and three species of *Myxobolus cyprinicola*, *Myxobolus drjagini*, and *Myxobolus mülleri* from the Tigris River in Baghdad. Abdullah and Abdullah [10] they collected 255 fish belonging to 17 species from Darbandikhan lake in Sulaymaniyah in Iraqi Kurdistan, and they found *C. regium* was infected with one species of ciliate *Ichthyophthirius multifiliis*. [11] who

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identified seven species of fish in the Euphrates River in the city of Al-Qaim, one of these species *C. regium*, and found this species was infected with one species of ciliate *Trichodina cottidarum*, and two species of protozoa *Myxobolus alienus*, *Myxobolus schulmani*, and a species of trematoda *Pseudolamproglena annulata*. Atwan [12] who studied parasites that infect Tigris River fish in the Kiryat area, and mentioned *C. regium* was infected with three species of zoospores *Myxobolus branchialis*, *Myxobolus dermatobius*, and *Myxobolus müelleri*, and four species of Monogenic worms (*Dactylogyrus deziensioides*, *Dactylogyrus deziensis*, *Dactylogyrus elegantis*, and *Dactylogyrus varicorhini*) and a species of ciliate (*Ichthyophthirius multifiliis*), and one species of Trematoda *Diplostomum spathaceum*. In the same year [13] explained the *C. regium* that infected with one species of ciliate *Trichodina strelkovi* and ten species of Monogenic (*Dactylogyrus barbioides*, *Dactylogyrus deziensis*, *Dactylogyrus nanoides*, *Dactylogyrus pavlovskyi*, *Dactylogyrus tub*, *Gyrodactylus baicalensis*, *Gyrodactylus barbi*, *Gyrodactylus katharineri*, *Gyrodactylus mikailovi*, *Microcotyle sp.*) were collected from Al-Shawaka area on the Tigris River in Baghdad from the Tigris River in the Al Atifiyah area in Baghdad. [14] who collected *C. regium*, and found this species was infected by three species of zoospores (*Myxobolus erythropthalmi*, *Myxobolus karuni*, *Myxobolus musculi*), and six species of trematoda.

1.2. *Captodon zillii* (Gervais,1848)

This species of fish was infected with many parasites, including Protozoa, Trematod, Cestoda, Nematoda, Acanthocephala, and Crustacea. [15] explained red-belly tilapia fish were a new host for two species of trematoda *Asymphylogora demeli*, *Asymphylostrema macracetabulum* from the Euphrates River in the city of Al-Musayyib. [12] who indicated red-belly tilapia was infected with seven species of Monogenic worms and three species of ciliates *Trichodina centrostrigeta*, *Trichodina strelkovi*, *Trichodina intermedia* were collected from the Tigris River in the Kuryaat area. [16] who found red-belly tilapia fish collected from the Kuryaat area on Tigris River was infected with Monogenic parasite *Cichlidogyrus tiberianus* and this was a new record in Iraq. Abbas [14] who collected 493 samples of fish from Tigris River in the Al-Atifiyah area in Baghdad, and explained red-belly tilapia were infected with a species of ciliate *Trichodina cottidarum* and three Monogenic *Dactylogyrus formosus*, *Dactylogyrus anchoratus*, *Cichlidogyrus sclerosus*. [17] who recorded one species of trematoda *Gyrodactylus macronychus* Sheyaa [18] they found that the red-belly tilapia was infected with species of Monogenic worm *Gyrodactylus longiradix*. This was a new recording in Iraq from the Tigris River in the region Al-Taji in Baghdad. [19] who identified three species of ciliates *Balantidium barbi*, *Trichodina cottidarum*, *Trichodinella inversa*, and three species of Monogenic *Cichlidogyrus sclerosus*, *Gyrodactylus latus*, *Dactylogyrus wegneri* that infected red belly tilapia found in the Karbala sewer.

1.3. *Oreochromis aureus*

The original habitat of the blue-belly tilapia is tropical and subtropical regions. These fish were found in Fresh water . They are dioecious animals [20]. This species of fish was infected with many parasites, including protozoa Trematoda worms, Cestoda tapeworms, and Nematoda worms. [21] they recorded two species of Monogenic worms on blue-belly tilapia, *Cichlidogyrus vic*, *Cichlidogyrus sclerosus* and recorded these species for the first time in Iraq. In his study on the fish of the Tigris River passing through the Kuryaat area in Baghdad, Atwan [22] found fish Blue-belly tilapia was infected with a species of Monogenic *Cichlidogyrus sclerosus*. [14] explained that blue-belly tilapia were infected with two species of Monogenic worms *Dactylogyrus achmerowi*, *Cichlidogyrus scleros* on the Tigris River in the Al-Atifiyah area in Baghdad. [17] collected 335 specimens of fishes from river in the Al-Kumaira area in Baghdad belonging to 12 species of fish , and explained the blue-belly tilapia did not appear to be infected. [19] found one species of Monogenic worms *Dactylogyrus inexpectatus* on blue-belly tilapia fish from the main Karbala trocar in Al-Har district.

1.4. *Silurus triostegus*,(Heckel, 1843)

This species is found in lakes, rivers, and marshes. It is widespread in Marshes. This species can withstand high temperatures. Their nutrition is on other fish, It is carnivores fish [23]. Balasim *et al.*, [24] collected 136 specimens from the Diyala River from the Al-Fadiliyah and Al-Sadur regions, and found *S. triostegus* was infected with two species of ciliates *Ichthyophthirius multifiliis*, and *Trichodina domerguei*. [25] they indicated the presence of the nematode larvae *Proleptinae gen. sp. BB* on *S. triostegus* from Lake Al-Hawaza, is considered a recording for the first time in Iraq. [10] indicated that there are two species of protozoa *Tetrahymena pyriformis*, *Trichodina pediculus* on *S. triostegus* in Lake Darbandikhan in Iraqi Kurdistan. At the same year [11] identified two species of ciliates *Chilodonella cyprinid* and *Trichodina elegini* that were collected from a river in Al-Qaim district.

1.5. *Leuciscus vorax* (Hecke 1843)

Leuciscus vorax live in rivers, Streams, ponds, rivers, and lakes contain plants. Their food is on plants at a young age, crustaceans and large fish feed on small fish and insects, and they live in an environment with high temperatures more than 25 C° [23]. These fish are infected with many parasites, including protozoa, trematoda, cestod tapeworms, nematodes, and Acanthocephala. [26] found four species of zoosporozoites on the *L. vorax*, two species of Digenea

Ascocotyle coleostoma, *Pseudochetosoma salmonicola*, a species of tapeworm *Proteocephalus oscuultus*, and a species of nematode *Contracaecum* sp. from Tigris River in Salah al-Din Governorate. Al-Saadi *et al.*, [27] found *L. vorax* were infected with two species of Monogenic worms *Paradiplozoon megan*, *Paradiplozoon pavlovskii*, and six species of crustaceans from Al-Husseiniyah River in Karbala Governorate. Al-Salmani [11] recorded six species of protozoa, three species of Monogenic worm *Gyrodactylus kherulensis*, *Paradiplozoon ergensi*, *Paradiplozoon rutili*, and one species of the crustacean *Lamproglana pulchella* that infected *L. vorex* Euphrates River at Al-Qaim District in Anbar Governorate. [28] found *L. vorex* were infected with Monogenic worm *Paradiplozoon ergensi* and *Paradiplozoon rutili* from the Euphrates River. [13] who identified two species of Monogenic worms *Eudiplozoon nipponicum*, *Dactylogyrus fallax*, and three species of crustaceans *Ergasilus mosulensis*, *Ergasilus sieboldi*, *Lamproglana pulchella* that infected *L. vorex* from the Tigris River in the Shawaka area, Baghdad. [14] recorded two species of trematodes *Paradiplozoon vojteki*, *Dactylogyrus fallax*, a species of tapeworm *Ligula intestinalis* from the Tigris River from the Al-Atifiyah area. [19] explained that the *L. vorex* was infected with species of nematode *Contracaecum* spp. from the main Karbala trocar.

1.6. *Carassius carassius* (Linnaeus, 1758)

Carassius carassius was infected with many parasites, including protozoa and worms Trematoda Saleh *et al.*, [29] identified one species of protozoa *Trichodina domerguei*, four species of Monogenic trematoda and one species of crustacean *Lernaea cyprinacea* from cultivation of fish in Baghdad. [15] who found *C. carassius* infected with trematoda *Dactylogyrus dulceiti*, *Dactylogyrus inexpectatus*, *Gyrodactylus sprostonae* from the Euphrates River in the Musayyib district. [9] they explained *C. carassius* were infected with three species of Monogenic *Dactylogyrus nachoratus*, *Dactylogyrus dulceiti*, *Dactylogyrus inexpectatus*, and one species of trematoda *Ascocotyle coleostoma* from three areas on the Tigris River, Baghdad. [19] indicated that the *C. carassius* were infected with one species of ciliate *Trichodina cottidarum* and two species of Monogenic worms *Dactylogyrus arquatus*, *Dactylogyrus inexpectatus* from the Al-Husseiniyah River in Al-Harr district in Karbala.

1.7. *Garra rufa* (Heckel 1843)

Garra rufa found in large and small rivers, streams, marshes, and lakes. These fish feed on algae and arthropods [23].This species of fish is infected with many parasites, including protozoa and worms Trematoda, Cestoda tapeworms, Nematoda, Acanthocephala, Crustacea [30] they found the *G. rufa* infected with Monogenic *Dactylogyrus rectotrabuc* from the Great-Zab River in northern Iraq. [31] who identified *Octomacrum europaeum* that infects *G. rufa* from the Euphrates River in the city Al-Musayyab. [32] recorded *Paradiplozoon bingolensis* on *G. rufa* in the Sharbazhar area in the city of Sulaymaniyah [33] who determined the parasitic infections affecting fish in the river Tigris in Baghdad Governorate, and found one species of mollusk *Unio pictorum*

1.8. *Luciobarbus xanthopterus* (Heckel, 1843)

This species of fish lives in deep waters. It feeds on algae, plants, frogs, crustaceans, soft-bodied organisms, larvae, insects, and fish, [23]. *L. xanthopterus* infected with many parasites, including protozoa and filamentous worms. Trematoda, Cestoda tapeworms, Nematoda, Acanthocephala, Crustacea. [34] who found one species of ciliate *Myxobolus dogieil* and four species of Monogenic on *L. xanthopterus* from the Hilla River in Babil Governorate. Al-Saadi *et al.*, [27] recorded six species of protozoa from the Husseinia in Karbala Governorate. [35] who explained *L. xanthopterus* were infected with one species of trematoda *Aspidogaster limacoides*, the larva of the nematode *Contracaecum* spp., and one species of Acanthocephala *Neoechinorhynchus rutili* from Euphrates River in the Al-Haqlaniyah district. [11] who identified four species of ciliates from the Euphrates River in Al-Qaim. Atwan [22] recorded one species of sporozoites *Myxobolus cyprinicola*, six species of Monogenic and one species of trematoda *Asymphylogora demeli* from the Tigris River passing through the Kuryaat area. [14] who found three species of sporozoites *Myxobolus bramae*, *Myxobolus squamae* and *Myxobolus gobiorum* and twelve species of Monogenic worms from Tigris River in the Al-Atifiyah area in Baghdad Governorate.

2. Conclusion

The current study reviewed fish parasites in Iraq and an important reference for all researchers and authors who plan to study this field more comprehensively in the future. Our study revealed The high level of water pollution resulting from factories, wastewater, and the frequent use of pesticides has led to create an environment suitable and encouraging for parasitic infection by suppressing the immunity of fish.

Compliance with ethical standards

Disclosure of conflict of interest

There was no conflict of interest in this study.

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