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Abtisam Jasim Abbas

College of Science, University of Al-Qadisiyah, [Abtisam.jasim@qu.edu.iq](mailto:Abtisam.jasim@qu.edu.iq)

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## ARTICLE

# Environmental and Diagnostic Study of Some Parasites in *Barbus Xanthopterus* Fish of Al-Diwaniyah River

Abtisam J. Abbas

College of Science, University of Al-Qadisiyah

## Abstract

The current study was concerned with investigating parasitic infections in *Barbus Xanthopterus* fish in Al-Diwaniyah River, for the period (July 2020–December 2020). (218) fish were collected from three different locations along the Al-Diwaniyah River. The results of the laboratory examination indicated that the fish were infected with the parasite *Chilodonella* Cyprinid and *Eimiria sinensis*. The current study recorded changes in the physical and chemical properties of Al-Diwaniyah River water, as the water temperature values, measured turbidity values, pH, electrical conductivity, hardness and TDS recorded a clear variation during the months of the study. The results of the statistical analysis indicated that there were significant differences between these variables at a level of probability ( $P \leq 0.05$ ).

**Keywords:** *Barbus Xanthopterus*, *Chilodonella cyprinid*, *Eimiria sinensis*

## 1. Introduction

In the environment, fish are exposed to many problems that affect their reproduction and threaten their survival, such as competition, parasitism and predation [1]. Fish parasites are one of the most important obstacles to the growth and reproduction of fish, in addition to their negative impact on the economic side, through high mortality in small fish or the growth of fish with low weight [2]. In general, parasites cause chemical and mechanical damage to their hosts, negatively affecting various physiological activities such as sun, reproduction and digestion [3]. Infection with fish parasites depends on the geographical location of the water body in which the fish live, the depth of the river, the type of animals and plants present [4]. Parasites are affected by the physiological, phenotypic and life characteristics of the host, such as the diet of the host, the age and sex of the host, the time of reproduction and activity [4]. Parasites migrate through the connective tissues of fish, which hinders growth and reproduction [5]. A number of fish parasites or their larval stages are

transmitted to humans as a result of eating raw or undercooked fish [5]. The current study aims to investigate some types of parasites in *Barbus Xanthopterus* fish, Al-Diwaniyah River.

## 2. Material and method

*Barbus Xanthopterus* fish samples were collected from fishermen in the Al-Diwaniyah River, with a rate of 3 replicates per month. That was during the study period that lasted six months, July-2020 until December 2020. The number of examined fish reached (218). The fish were transferred to the laboratory within a few hours, the fish were subjected To physical examination by noting the injuries (scars, bleeding, falling scales, ulcers, color and quantity of mucous surrounding the body of the fish). DPX, then the slide was loaded according to the method [6]. Parasites were diagnosed by taking measurements of each parasite and drawing it with a reconnaissance camera, then diagnosis according to [7].

The Water samples were taken in three locations in the Al-Diwaniyah River, two samples per month

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E-mail address: [Abtisam.jasim@qu.edu.iq](mailto:Abtisam.jasim@qu.edu.iq).

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during the study period, using opaque plastic bottles. The samples were taken to the laboratory for physical and chemical analyzes, in addition to field experiments that included: Water temperature using [a mercury thermometer], Turbidity measure by [the Turbidity meter type HANA Lp 2000], EC measure by using [Electrical Conductivity type H\99300 HANNA, PH using electronic PH meter type Iovibond 150 Senso Direct.

### 3. Results and discussion

(218) *Barbus Xanthopterus* fish were collected from three areas along Al-Diwaniyah River in Al-Diwaniyah Governorate and examined for parasitic infestations. The results indicated that the total infection rate was 39.44%, or 86 samples out of 218. [Table 1](#).

By investigating the type of parasite, the results indicated that *Barbus Xanthopterus* was infected with the primary parasite *Chilodonella Cyprinid* (moroff, 1902).

This parasite settles in the skin and gills of infected fish. It belongs to.

Phyllum: Ciliophora  
Class: Cilita  
Order: Phllopharyngia  
Family: Chlamyodontidae

The results indicated that the species *Eimiria sinensis*, which belongs to.

Class: Sporozoa  
Order: Coccidia  
Family: Emeridae

The parasite infection rates were recorded for the two species (*Chilodonella Cyprinid*, *Eimiria sinensis*) (56.7%–43.29%), respectively. [Table 2](#).

#### 3.1. Physical and chemical properties of Al-Diwaniyah river

Observing the characteristics of the Al-Diwaniyah River is one of the most important environmental

*Table 1. the number of fish samples and the total infestation rate during the months of the study.*

months of study	No. of fish samples examined	No. of infected cases	Total infection rate
July	39	18	46.15 %
August	42	19	45.23 %
September	49	22	44.89 %
October	32	13	40.62 %
November	30	10	33.33 %
December	26	4	15.38 %
Total	218	97	44.49 %

*Table 2. Infection rate of different genera and identified species in Barbus Xanthopterus fish.*

Diagnosed parasites	No. of samples of infected fish	Infection rate%
C.cyprinid	55	56.7 %
E.sinensis	42	43.29 %

studies, especially the physical and chemical properties of the river (see [Table 3](#)). The living organisms affected by seasonal and locational variations and the ecological condition of the river, [Table 4](#).

The current study indicated that the water temperature varies with the different months of the year. Water temperature is an important determinant of water density, which makes it a determining factor in the distribution of organisms in water bodies [8]. This factor has an important role in the photosynthesis of aquatic plants and the decomposition of organic matter, which affects the pH, dissolved oxygen and dissolved carbon dioxide gas [9–11].

The results indicated that the pH values corresponded to the basal values. The baseline is affected by temperature, the increase in the decomposition of organic matter, the increase in the concentration of (Co2), the high water levels and the concentration of magnesium [12]. The reason for the decrease in PH in some hot months, is the consumption of free Co2 by the producing organisms, in addition to the presence of carbonate ions, bicarbonates and dissolved silicate salts in water [13].

The results of the electrical conductivity values, as well as the values of dissolved oxygen and the values of the vital oxygen requirement, varied during the months of the study. The results showed varying levels of turbidity. The reason for this result is due to the high speed of water flow and the mixing and raising of water deposits by water currents [9]. The increase in turbidity may be due to low water levels in some months and high temperatures that result in increased rates Evaporation, and the fluctuation of the speed of its flow changes the turbidity value of the water as a result of suspended substances carried by the river when it flows [14,15]. The rise in hardness in some months is due to the high values of calcium carbonate concentrations and suspended and dissolved substances in the river [16], while [17] indicated that its rise results from a decrease in the water level, which results in an increase in the concentration of ions causing water hardness. In general, it increases in the summer months as a result of dust storms that are loaded with dust particles, which are a source of calcium carbonate [18].

The results indicate the high values of TDS concentrations in the Al-Diwaniyah River. The reason for this increase may be the decrease in the river

Table 3. Arithmetic mean, standard deviation and range (first grade), upper and lower values of physical and chemical parameters (second grade) in Al-diwaniyah River during stations.

Parameters	Stations		
	1	2	3
Water Temp.	16.314 ± 5.261 a 8–26	16.008 ± 5.400 a 10.87–17	17.030 ± 5.216 a 10–27
pH	7.663 ± 0.245 a 7.2–8.2	7.642 ± 0.130 a 7.31–7.9	7.710 ± 0.115 a 7.5–7
T.D.S	851.418 ± 146.644 a 630–1011	872.285 ± 130.418 a 660–1011	876.429 ± 158.400 a 650–1112
Turbidity	8.313 ± 2.618 b 3–12	13.560 ± 6.213 a 8–26.7	13.475 ± 6.630 a 8–16.7
D.O	7.645 ± 1.042 a 7–9	7.518 ± 0.984 a 6–9.5	7.540 ± 1.0320 a 6–8.7
Tot-Hardness	511.143 ± 8.552 a 505–523	480.618 ± 36.750 b 430–517	451.275 ± 56.642 c 360–515

The averages carrying different letters within the same row differ significantly between each other.

Table 4. Arithmetic mean, standard deviation and range of parameters of the study period from July-2020 to December-2020.

Parameters	July 2020	Ogeust	September	October	November	December
Water Temp.	25 ± 1.2 a 23 ± 26	21.064 ± 1.320 b 20 ± 23	12.023 ± 1.140 d 11 ± 14	10.877 ± 0.783 e 9 ± 11	13.123 ± 0.608 d 12 ± 13	16.2 ± 1.013 c 15 ± 20
pH	7.526 ± 0.074 c 7.32–7.63	7.6766 ± 0.158 bc 7.3–8	7.732 ± 0.147 ab 7.4–8	7.56 ± 0.193 a 7.6–8.2	7.766 ± 0.170 ab 7.2–8	7.622 ± 0.131 bc 7.3–7.3
T.D.S	988 ± 19.025 b 960–1022	1007 ± 14.281 ab 970–1013	1038.656 ± 51.253 a 980–1111	926.6656 ± 14.68 c 900–940	800 ± 71.926 d 710–900	674 ± 11.510 e 650–6958
Turbidity	22.266 ± 7.711 a 11–27.7	16.422 ± 4.032 b 11–20	9.332 ± 2.4 cd 6–13	12 ± 3.112 bc 8–15	10.156 ± 1.447 cd 7–11	7.6656 ± 2.168 d 3–9
D.O	6.322 ± 0.210 d 6–5.6	7.066 ± 0.710 c 5–7	7.556 ± 0.370 b 7–6	9.3 ± 0.364 a 8–9	7.956 ± 0.516 b 6–8	7.7 ± 0.224 b 7.4–8.0
Tot-Hardness	504.767 ± 11.934 a 510–470 0.54–0.7	510 ± 7.4 a 520–500 0.6–0.8	513.322 ± 7.286 a 514–500 0.7–1.5	517.322 ± 9.300 a 518–500 1.27–1	482.656 ± 48.548 a 523–410 0.5–1.2	447.322 ± 64.951 b 521–360 0.5–0.7

water level or the speed of water flow during the time of sampling and measuring the parameters under study As the speed of the flow and the decrease in the water level is a reason for the increase in the concentration of the components and the increase in the concentration of salts [14,15].

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