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External Parasites of Acanthopagrus Latus in Bahr Al-Najaf, Iraq

Haki Abdulabas Issa Kareef[1*]
[1]Medical Laboratory Technology Department, Kufa Technical Institute, Al-Furat Al-Awsat Technical University, Iraq

Email: Kin.hkee@atu.edu.iq

Abstract. 112 shank fish (Acamthopagruslatus) from Bahr Al-Najaf water in AL-Najaf province were examined. 15.1% was the overall percentage of external parasite infection and intensity. Tetrahymenapyriformis infection rate was 3.5%, Chloromyxumdubinm infection rate was 12.5% with intensity 4.0, Argulus foliacus infection rate was 14.2% with intensity 3.4, and Ergassilusmosulens 9.8% with intensity 4.2. The percentage of infections with the parasites under investigation varied by month.

Highlights:

1. Parasite Diversity: Four external parasite species were identified in Acanthopagrus latus, affecting different body parts.
2. Monthly Variations: Infection rates fluctuated across months, with environmental factors likely influencing prevalence.
3. Statistical Analysis: No significant monthly differences in infection rates were found, suggesting stable environmental or host-parasite dynamics.

Keywords: Acanthopagrus Latus, External Parasites, Bahr Al-Najaf, Fish Parasitology, Iraq Aquatic Ecosystem

Introduction

Fish is a constant resource with an endless supply, particularly in countries with lakes, rivers, marshes, and other bodies of water for fish farming [1]. The demand for fish as an animal protein source rises in tandem with the human population [2]. Fish contributes significantly to food security in developing and impoverished countries due to its abundance of nutrients [3],[4] especially animal protein, which is easily digested and high in unsaturated fatty acids, mostly Omega-6 and Omega-3, which have a positive impact on blood pressure, heart disease, and immunological disorders [5]. The water reservoirs in Iraq are a good source for fish production, and there is an urgent need to pay attention to studying parasitic infections of fish and conducting studies to prevent the destruction of fish [6]. This has been the subject of numerous investigations, such as [7], who studied the effect of water source on the infection of common carp in some

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fish farms in Kurdistan, Iraq. Despite the high concentration of salts, which reached 4510 mg/L and the pH range of 4–10 [8], the shank fish had the best luck adapting to live and breed in salty water, spreading throughout Bahr Al-Najaf and Al-Razzazah in recent years [9]. This is because the shank fish is known for its high tolerance of environmental variables and its high probability of coexisting in water bodies of varying degrees of salinity and temperature [10]. This study was conducted to investigate and identify external parasites on the shank fish in Bahr Al-Najaf in order to grow and preserve fish wealthy because there aren't many studies on parasitic infection on these fish.

Methodology

112 shank fish were gathered from Bahr Al-Najaf between July and November of 2023. In collaboration with a few fishermen, the fish were collected randomly and at regular intervals during the month from a few fishing locations in Bahr Al-Najaf using swindling nets. Following the fish's external examination with the naked eye, swabs from the skin, fins, and gills were taken out and examined under a compound microscope with a magnification power ranging from 40 to 1000 times. The isolated parasites were then identified according to [11], [12]. Overall changes in the rate of injury severity (mean intensity of infection) and incidence rate (percentage of infection) were tracked based on [13], [14]

Statistical Analysis

The Chi-square test was performed using the statistical program [15], in accordance with the contingency tables displayed, to compare the changes in the rate of infection and the rate of severity of infection with ectoparasites in the most well-known research

Ethical approval

The study was approved by the human ethics committee of Medical Laboratory Technology Department, Kufa Technical Institute, Al-Furat Al-Awsat Technical University, Everyone who took part in the study was told about it and asked to sign a consent form. The patient was also guaranteed that his information would be kept private.

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Result

1. Recorded Parasite Species on Shank Fish (Acanthopagrus latus) Based on Their Taxonomic Classification

The results of the study showed that four types of external parasites were recorded on shank fish (Acanthopagrus latus) in the waters of the Najaf Sea in Najaf Governorate, Iraq. These parasites belong to different taxonomic groups within the animal kingdom, where two types of protozoa were recorded, namely Tetrahymena pyriformis from the Tetrahymenadae family and Chloromyxum dubium from the Spherosporidae family. Two types of parasitic crustaceans were also recorded, namely Argulus foliaceus from the Argulidae family and Ergasilus mosulensis from the Ergasilidae family. These parasites were found in different infection sites on the fish body, where some types were concentrated on the skin and fins, while others targeted the gills, indicating a variation in infection patterns and their effect on the host. These results reflect the importance of studying external parasites in fish and their impact on aquatic and environmental health.

Table 1. Classification and Distribution of Parasites in Relation to Injury Sites

Parasites	**Injury Site**
Kingdom:Protista	
SubKingdom:Protozoa	
Class: Ciliata	
Order Holotricha	
Family: Tetrahymenadae	
1.*Tetrahymenapyriformis* (Timofeev, 1962).	G.S
Phylum: Protozoa	
Class: Cnidosporidia	
Order: Myxosporidia	
Family: Spherosporidae	
2. *Chloromyxumdubium* (Auerbach, 1908).	G.F
Phylum: Adnropoda	
Class: Crustacea	
Order: Branchiura	
Family: Argulidae	
3.*Argulusfoliaceus* (L.,1728).	G
Order: Copepoda	
Family: Ergasilidae	
4.*Ergassilusmosulensis* (Rehemo, 1982).	G.S

Skin=S, Fins=F, Gills=G

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2. Monthly Variations in Infection Percentage and Severity of External Parasites in Shank Fish (Acanthopagrus latus)

The results of the study showed that there was a monthly variation in the infection rate and severity of external parasites on the examined shank fish (Acanthopagrus latus) during the period from July to November. The highest infection rate of Tetrahymena pyriformis was recorded in August (20.8%), while the lowest rate was in October (10.5%). For Chloromyxum dubium, the highest infection rate was recorded in July (11.5%), while the lowest was in November (8.7%). As for Argulus foliaceus, the highest infection rate was recorded in September (20.0%), while the rate decreased in October (5.8%). Ergasilus mosulensis showed the highest infection rate in July (7.6%), and the lowest in November (5.0%). The overall incidence of infection with the four parasites during the study period was 15.1%, 12.5%, 14.2%, and 9.8%, respectively, indicating a difference in infection rates between the studied months, which may be related to environmental and seasonal factors that affect the availability and prevalence of these parasites.

Table 2. Core Principles of Scientific Management

Ergassilusmosulensis	Argulus Foliaceus	Chloromyxum dubium	Tetrahymcna Pyriformis	Number of examined fish	Months
7.66	11.55	11.56	15.42	26	July
8.34	12.54	16.63	20.84	24	August
15.03	20.05	10.03	15.04	20	September
10.55	5.83	15.82	10.54	19	October

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8.7 5	13.03	8.73	13.04	23	November
9.84.2	14.23.4	12.54.0	15.13.5	112	the total rate

3. Statistical Analysis of External Parasite Infections in Shank Fish (Acanthopagrus latus)

The results of the statistical analysis of the infection rates of external parasites on shank fish (Acanthopagrus latus) during the study period showed monthly differences in infection rates. The highest number of infected fish was recorded in July (12 infected fish), while the lowest number was in October (5 infected fish). The Chi-Square test showed the calculated values for each month, ranging from 0.53 in October to 1.60 in July, while the table value was 3.841. Since all the calculated values are less than the table value, the differences between the studied months are not statistically significant at the significance level used. These results reflect monthly changes in infection rates, which may be affected by environmental and seasonal factors that affect the spread of parasites in the aquatic environment.

Table 3. Comparison of Infection Rates and Chi-Square Analysis Across Study Months

X^2 Tabular	X^2 Calculated	Number of infected fish	Number of uninfected fish	Number of fish examined	Months
	1.60	12	14	26	July
3.841	1.20	9	15	24	August
	0.92	7	12	20	September
	0.53	5	14	19	October
	0.91	6	17	23	November

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Discussion

Four parasites belonging to four families were identified in the skin, fin, and gill smears of 112 shank fish (Table 1) when examined under a microscope: Tetrahymena pyriformis, which is belonging to the Tetrahymenadae; Chloromyxumdubium, belonging to the Spheosporidae; Argulus folioceus, belonging to the Argulidae; and Ergassilusmosulensis, belonging to the Ergasilidae. It became evident that the gills, fins, and skin were the primary sites of parasite infections and that the severity and rate of infection varied by species (Table 2). Fish infections with parasites are caused by the climate. Because Bahr Al-Najaf increasing salinity lowers the rate and severity of infection with external parasites and shifts the environment toward high salinity, which is beneficial for free-living neighborhoods, it also affects internal parasites that are exposed to the influence of the external environment at certain stages of their lives. Additionally, it was determined that the infected fish had been infected with multiple parasite species in conditions that are favorable to parasite multiplication. Shank fish, which were brought from Shatt Al-Arab and dispersed around Al-Razaza Lake in Karbala province, acclimated to the water of Bahr Al-Najaf. According to the current study, the first fish in Bahr Al-Najaf were Shank fish. At the probability level ($P > 0.05$), the statistical analysis revealed no significant differences in the percentage of infection with the parasites under investigation (table 3).

Conclusion

This study highlights the monthly variations in the infection rates and severity of external parasites in Acanthopagrus latus from Bahr Al-Najaf waters. The recorded parasites belonged to different taxonomic groups, with notable fluctuations in infection prevalence across the study period. Statistical analysis showed no significant differences between months, suggesting that infections may be influenced by stable environmental conditions or host-parasite interactions. Understanding these parasitic infections is crucial for fish health management and aquaculture sustainability. Future studies should investigate environmental factors contributing to parasite prevalence and explore preventive measures to mitigate their impact on fish populations in Iraqi waters.

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