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STUDY OF THE BENTHIC INVERTEBRATE COMMUNITY IN AL-TAYEB RIVER, SOUTHERN IRAQ

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Abstract:
The current study included the diversity of the benthic invertebrate community in Al-Tayyib River / southern Iraq, in addition to some physical and chemical properties of the river water, for the period from the beginning of January 2022. Six stations were chosen to collect samples monthly. The results showed that the water temperature during the study period ranged (between 19-30) and the river water, salty, ranged between (5.1-6.14) ‰, while the pH values were neutral, ranging from (2.7-9) The study showed that the river water is well ventilated, as it recorded high values of dissolved oxygen, which ranged between (7-12 mg / liter). The river water became almost hard, so the total hardness values ranged between (725-5880 mg/l), and a total of 28,212 benthic invertebrates from all study stations and throughout the study period were distributed over nine taxonomic ranks, and crustaceans were dominated by 6,238 individuals, or 29% of the total number. Spatial and temporal variation in the distribution of species. The highest total number of benthic vertebrates , amounting to 1224 individuals. Shannon Weiner recorded high values for the diversity of invertebrates that ranged between 1.4-2.8 bits / individual. Jacquard's results showed that the strongest similarity relationship for benthic invertebrates amounted to 62%.

Keywords: Indication Pollution, Soil , Physiological effect, elements.

1- INTRODUCTION

Al-Tayeb Reserve is a project for a reserve in Al-Tayeb District, northeastern Maysan Governorate in southeastern Iraq, adjacent to the Iraqi-Iranian border, in the alluvial salt marshes of the Tigris and Euphrates, in the territory of fresh internal waters at the bottom of the Tigris and Euphrates rivers. Its area is 1192 square kilometers, with varying topography and plant and animal diversity. There are two rivers in the reserve, the Al-Tayyib River and the Dwerij River, and seasonal marshes arise in winter and dry up in summer, and in the reserve there are animals threatened with extinction, such as the reem gazelle and the spiny-tailed lizard. In raising sheep and buffaloes, agriculture, grazing, and gravel extraction. In the year 2015 AD, the Global Environment Facility decided to fund the Al-Tayyib Reserve to be an experimental prelude to the establishment of other protected areas throughout Iraq (Proto- Neto, 2003). The name of the project is “A project to establish a network of protected areas in Iraq (Al-Tayyib and Dalamj) (Apaydın, 2013). On April 21, 2022, the Maysan Environment Directorate announced that “the first steps were taken to demarcate the borders of the Al-Tayyib Reserve, where the status of the reserve and

logistical matters on the ground were discussed by reviewing the plans and maps that were prepared for that." Water imports in the Aldürg River. The environmental diversity of Al-Tayyib through its location in the Al-Tayyib area in two terrestrial environmental regions, namely the desert and semi-desert of the Nobu-Sandian in southern Iran (PA1328) and the alluvial salt marshes of the Tigris and Euphrates rivers (PA0906), both of which are classified under critical conservation status, in addition to the aquatic environmental region (the region of fresh internal waters at the bottom of the Tigris and Euphrates rivers) (Sebtie, 2009). The location of the Al-Tayyib region in these regions contributed the diversity of the environments of the region, where they vary and vary in the Iraqi-Iranian border, as it is formed from the environment of grassy hills and sandy hills to reduce highlands, as we move towards the west, where the prevailing grassy plains are formed interspersed with seasonal wetlands and salty grassy marshes. The geographical and hydrological diversity found in the Al-Tayeb region contributes to the richness of the biodiversity of the region. The Tayeb region is famous for its great diversity habitats, in which different types of plants grow , It's a big deal in plants as a result of the great difference in heights, which resulted in diversity different types of animals, especially birds, live there the plant. There are no threatened plant species in Al Tayeb extinction, but it is characterized by great plant diversity recording 230 plant species in Wadi al-Tayeb belonging to 44 families each of the gymnosperms and covered as seeds Iraqi flora included records of one species and subspecies (Taqi, 2006). The last two settlers in the Al-Tayeb region in Iraq, and they are rechingeri Eremurus and Arnebia linearifolia , Desertorum. subsp. In addition to that grow some other species of medical and economic importance on hills, hillsides and other environments. Al-Tayeb region hosts a large number of animal species threatened with extinction, the most important of which are: Plains eagle nipalensis Aquila (EN), Royal eagle Aquila (VU), Everyone migrates (Dobson, *et al.* 2012).

The two types to an area good during my semester Spring and Autumn, and considered destroy environments and collide electric high pressure columns one of the most important threats they face during the migration period in addition to their exposure to households and local trade. In order to know the nature of the water surface and its quality in a good way, sufficient information must be available about the neighborhoods in which it lives, as the organism can provide evidence of the quality and health of its environment. Invertebrates Benthic are among the most important groups that describe the quality of the aquatic environment in which they live. Invertebrates that are sedentary or that inhabit the bottom of water bodies are either found above or sediment or below the bottom. It lives on any structures present at the bottom, and some of them live above or below rocks and organic particles, and some of them build tubes, networks or lives in holes in bottom sediments (Wynn, 2022). The benthic community is complex and includes diverse taxonomic groups. Invertebrate community composition is affected benthic properties of the physical and chemical bodies of water, including the nature of the bottom, depth, water temperature, and the amount of dissolved oxygen. pH, Entry of heavy elements and toxic substances into the aquatic environment from agricultural and industrial sources affects the composition of the community benthic invertebrates with the physical and chemical

characteristics of water bodies, including the nature of the bottom, depth, water temperature, and the amount of dissolved oxygen and pH, entry of heavy elements and toxic substances into the aquatic environment from agricultural and industrial sources, So, the current study targeted the biodiversity of the benthic vertebrate community in the Tayeb River, in addition to the physical and chemical characteristics, and a study dealing with the benthic invertebrates in this water body (Jeff and Bangeman, 2022).

2. Experimental

2.1. Sampling

Water samples were collected from the study stations during the period of January 2022 using 5-liter polyethylene containers to conduct chemical analysis. Water samples were also collected using 234-liter glass bottles after it was well washed for the purpose of conducting laboratory experiments, either with regard to the qualitative and quantitative study of benthic vertebrates, to collect bottom sediment and aquatic plants, and the samples were preserved by adding formalin 4% in special vials for laboratory examination. K was also measured from the temperature. Water using a mercury thermometer in which the pH and salinity were gradually reduced using a field conductivity meter. Digital Conductivity Meter Portable Manufactured by Hanna Company Salinity was also calculated by adopting the conductivity values of the water according to what was mentioned in (Stavridou, *et al.* 2020), the dissolved oxygen was also measured by the modification method described in (Bachmann-Pfabe, *et al.* 2020). Measurement of total hardness The method described in (Ali, *et al.* 2020), benthic invertebrates was diagnosed based on the taxonomic keys. After counting and diagnosing invertebrate species, the following biological indicators were calculated: Shanon-Weiner diversH

= -Σ(ni / N) Ln ni / N)ity index (H)

Since: ni = the number of individuals of one species in the N = the total number of individuals in the same site xpress the results in .Ind/ bit (as a bit equals one piece of information

The species uniformity index (E) :The species homogeneity index was calculated according to the formula given in (Awni, *et al.* 2008).

E = H/LnS

Since: S Ln is equal to the largest theoretical value of diversity (max H), (H = value of Shannon Weiner criterion, S = number of species in the site.

Jacquard's Index Similarity

According to this indicator according to the formula shown in (Barwary,1993).

Where A is the total number of species at site A, B is the total number of species at site B,

C = the total number of common species between sites A and B.

3. Results and Discussion

Physical and chemical properties of the waters of Al-Tayyib River:

The values of the water temperature during the study period ranged between 6 as the lowest value in most of the study stations through statistical analysis. There were no significant differences (P ≤ 05.0) in the water temperature among the six study stations, the results of the current study recorded similar pH values, ranging between 7. Therefore, the river water is neutral, denoting alkaline, and upon statistical analysis. There were no significant differences (P ≤ 0.05) between the study stations. The results of the current study showed that the highest value of dissolved oxygen was 90 mg/l good aeration, high vegetation density, and the ability to self-purify, so the high concentrations of dissolved oxygen in the aquatic environment are evidence of the suitability of that water for living organisms according (Grigoriou, *et al.* 2020).

The results showed that the salinity values ranged between 3.8 ‰ and the statistical analysis showed that there were significant differences (P ≤ 0.05) for the salinity values between the study stations, so they can be considered salty, ranging from low salinity to medium salinity. The results of the current study also showed that the hardness values the total hardness ranged between its lowest value of 825 mg/L, and the statistical analysis showed that there were significant differences (P≤0.05) in the total hardness values between the study stations. This is due to the nature of the study area and the water drained from the neighboring lands according to (Mai, *et al.* 2020).

Diversity in the benthic invertebrate community in the El Tayeb River:

In the current study, 1286 benthic invertebrates were isolated as follows:

Phylum: Platyhelminthes, Class: Turbellaria

Phylum: Mollusca

Phylum: Nematoda

Phylum: Rotifera

Phylum: Annelida

Phylum: Arthropoda (Class: Crustacea, Class: Insecta, Class: Arachinda)

Benthic invertebrates in their distribution at different study stations the crustacean group recorded the highest percentage among the invertebrate groups, reaching 30%, followed by insects, with a percentage of 24%, wide range of diversity in morphology and lifestyle enables it live and survive successfully on the bottom, which is characterized by the availability of plants and algae, with high oxygen values, as well as low salinity and hardness values. Suitable conditions are available for this group, and mainly their numbers increase in waters with high oxygen content, which may be due to the nature of the aquatic environment in terms of the physical and chemical factors of water and the availability of food according to (Zhang, *et al.* 2020).

The results of the current study calculated that the highest value of diversity according to the Shannon Wiener index reached in most stations close to this value (2.8 and 6.8) bits/person. According to the values of Shannon in the current study, the Tayyib River has a high diversity, because the biodiversity indicators refer to the number of species in the sample and the number of individuals among these species, and the high values of the Shannon Wiener index indicate high diversity, and the value higher

than 4 indicates a high diversity of a biological community healthy and healthy living in a stable environment, while a value less than 4 indicates the presence of environmental pressures resulting from pollution, which lead to the disappearance and migration of sensitive species. This is due to an increase in the water level, which led to a decrease in salinity, hardness and availability of nutrients. The reason for the changes in the diversity values may be attributed to the nature of the life cycle of each species. In the diversity of these aggregates in the general estuary river 2.18, It is due to the different environmental conditions of the study stations, which directly affect the distribution and composition of the invertebrate community according to (UNEP-WCMC. 2019; Neggaz Nassima, 2021).

The Jacquard similarity index was used to find out the similarity between the study stations through the presence of species It was noted that the strongest similarity relationship was recorded between the stations and reached 62% This is due to the great similarity in the physical, chemical and hydrological characteristics of the river, and it seemed clear that the similarity began to gradually decrease as we moved away from the feeding channel and headed towards the drainage channel according (Reyam, 2019; Ati, *et al.* 2022). The high similarity rate for benthic invertebrates in the Jacquard index shows the similarity between sites depends on the composition of species and measures changes in the composition of communities in Water bodies according to (Ati*, et al.* 2022).

Conclusion

The diversity in the benthic invertebrate community in Nahr El-Tayeb, in addition to some chemical characteristics of the water and the use of indicators gives a clear idea of the benthic invertebrate community with the use of the Jacquard similarity index to know the similarity between the study stations through the presence of species. This is due to the great similarity in the physical, chemical and hydrological characteristics of the river, and it seemed clear that the similarity began to gradually decrease as we moved away from the feeding channel and headed towards the drainage channel. The high similarity rate for benthic vertebrates in the Jacquard index shows the similarity between sites depends on the composition of species and measures changes in the composition of communities in Bodies of water so can develop an accurate and strategic plan to study environmental conditions and carry out a detailed and integrated survey of resources Natural resources, and the development and modernization of water stations monitoring networks in that region to adapt to climate changes and drought and reduce its negative effects. Field and field studies must be conducted for the purpose of identifying the quantitative and qualitative characteristics of water for the rest of the region.

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