QUALITATIVE STUDY OF PHYTOPLANKTON IN AL-RUMAYTHA RIVER. IRAQ

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Abstract

The current study was conducted on the Rumatha River for six months from Novembr 2021 to May 2022. Three locations were chosen along the river. There were 97 Phytoplankton species identified, belonging to 60 genera. The Diatoms (*Bacillariophyceae)* won the most of it, forming83 species- 46 of them *Cyanophyceae* (10 species belonging to10 genera) followed by *Euglenophyceae* (4 species belonging to 4 genera) Less common. Some types of phytoplankton existed in most of the duration of the study, including; *Lyngbya aeruginosa , Oscillatoria articulate , Epitheria sp , Euhlena polymorpha, Melosira. Ambigua , Amphiprora alata , campylodiscus*
Keywords: phytoplankton , (AL_Rumatha River) ,Iraq.

Introduction

The word "algae" refers to a broad collection of organisms that may be grouped according to morphology and general physiology. It is derived from the Latin word for seaweed. Their sexual organs are not covered, and they are basic animals without roots, stalks, or even leaves. They are mostly photosynthetic and autotrophic (get all of their nutrients from inorganic sources) (they generate complex carbon compounds from carbon dioxide and light energy). Some algae have given rise to secondary heterotrophic algae. (*Bellinger and sigee 2015*).

Phytoplankton are microunicellular, free-floating colonies that produce photoautotrophic in watery conditions can grow. Any aquatic ecosystem's primary production and global food webs depend heavily on phytoplankton. *(Kamboj et al., 2020*).

There is some study in the Iraq that use phytoplankton as AL-Nashy (2016) Assess the AL-Diwaniya River/Iraq Using Diatoms as Bioindicators Diatoms species were detected 170 times throughout the research period and belong to 34 genera, Centrales 12 times and returned to 5 genera, and Pennales 158 times and belong to 32 genera (*Achnanthes, Cymbella, Nitzschia, Navicula*). During the research period, other categories predominated in terms of existence and number, and the river's water was highly contaminated, according to the Palmer Index.

Also *Zubaidi* (2017) investigated the physical and chemical features of the AL Diwaniya River, as well as their impact on the phytoplankton population. A total of 207 phytoplankton species were detected, with 130 of them belonging to diatoms, classified into 13 species of central diatoms, 117 species of feathery diatoms, 42 species of green algae, 29 species of blue-green algae, and three species each of *Euglenopyceae* and *pyrrophyceae*.

Phytoplankton and physical and chemical qualities had a substantial positive and negative association. Aim of the study using variety indices to assess the amount and spread of phytoplankton

Material and Method

a significant river in the region, The Al-Rumaytha River's length within the governorate's geographical extension is (120 km), while the Euphrates River's length within the governorate's borders is (120 km) (26,600)

For the first station is located south of the river, abundant extensive aquatic vegetation, longitude "21.30'9°45and latitude"23.31'31°33. The second station longitude a"31.07'45°12 and latitude"6.70'31°31 lies in the river's center, when it starts to grow. The third station longitude"45.33'45°14 and latitude"24.04'31°29 is frequently less polluted). Three sites were selected on Al-Rumaytha River to collect the study samples according to Figure (1).
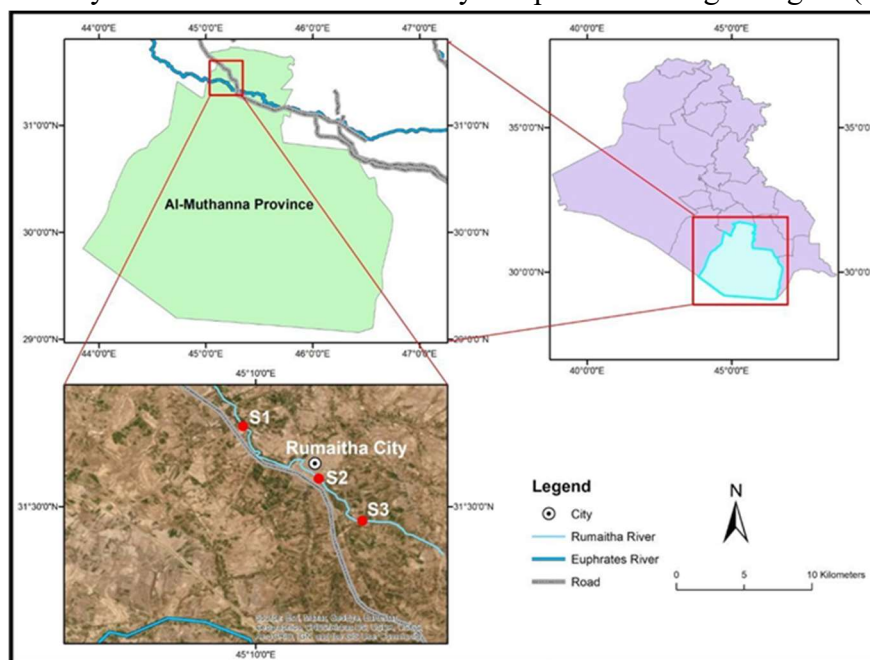

Fig 1: the site of study in Al-Rumaytha river.

The phytoplankton collection by the net with pores 20 micrometers in a diameter it used by towing in a direction opposite to the current of the water stream for 10-15 minutes. The filtration process has then taken and 250 ml was taken and placed in plastic bottles in refrigerated containers after have been saved by Lugol's solution in the field as explained by (*Vollenweider* 1974) Temporary slides were prepared on X40 for the diagnosis of non-diatomic algae by using an optical microscope (type CYAN, Belgian) using some diagnostic sources including:(*Wehr & Sheath*, *2003;Belcher*) The diatomic algae have diagnosed after dissolving the organic matter and explaining the diatom structures using concentrated nitric acid. The test has performed on 100X and the diagnosis was based on the diagnostic sources (*Lavoie et al., 2008;Germain 1981)* .

Results and Discussion

The definition of phytoplankton used by (*Reynold 2006*) is the collective of photosynthetic microorganisms, adapted to live partly or continuously in open water, where they remain, near the surface because the surface water of the open sea and large lakes are regularly mixed each day by wind. Phytoplankton are tiny (one-celled) algae, plant-like organisms that use sunlight as an energy source to make their own food through a process called photosynthesis (*Bellinger and Sigee, 2010*).

Results are shown 97 species of phytoplankton that were diagnosed, and they belonged to 60 genera. The majority of it was gained by the diatoms (*Bacillariophyceae)*, which formed 83 species, 46 of *cyanophyceae* (10 species in 10 genera) *Euylenophyceae* (4 species belonging to 4 genera) less typical. Throughout the majority of the study's time, certain kinds of phytoplankton were present, including; *Lyngbya aeruginosa , Oscillatoria articulate , Epitheria sp , Euhlena polymorpha, Melosira. Ambigua , Amphiprora alata , campylodiscus*

The results show that the third site had the most species, with 34 species belonging to 21 genera, while the first site had the fewest, with 19 species belonging to 32 genera. This might be due to a variety of environmental factors, such as the existence of aquatic plants, which aid in the growth of various numbers of algae connected to them and their separation causes. A rise in phytoplankton the number of residential and industrial plants, the wind, and the depth of water bodies all have an impact on the variety of phytoplankton. (*Karakaoglu and colleagues* 2004). (Table 1).

Table 1: 1 Number& types of phytoplankton species recorded in the study sites

Sites	St1		St2		St3	
Classes	Genus	Species	Genus	Species	Genus	Species
Cyanophyceae	2	2	3	3	5	5
Bacillariophyta	16	29	15	26	15	28
Euylenophyceae	1	1	2	2	1	1
Total	19	32	20	31	21	34

Due to the ability of *Bacillariophyta* to develop in various aquatic environments *(Leelahakriengkrai and peeraporpisal, 2010*) and the high concentrations of silica in the medium living, *Bacillariophyta* manifested as dominant in the species recorded in the research locations, respectively (*Ekwu and Sikoki* , 2006)

noted that the dominance of diatoms is due to its ability to bear harsh environmental conditions such as lack of light as well as its ability to grow in different aquatic environments due to the silica cell wall. Because of the close relationship between them *(Eyo et al*., 2013)

Third site is located inside agricultural land; there may be variation in the quantity of plant nutrients, which might account for the increase in phytoplankton counts. The concentration of plant nutrients in the river increases as a result of the addition of water from agricultural feces that are dumped there to what is to be removed from human waste. Due to untreated wastewater and garbage, river water contains a large amount of contaminants, which may be the cause of the drop

in phytoplankton species. In site two (*Al- Zubaidi, khitam Abbas Marhoun 2017*)

Specific of the phytoplankton exhibited dominance in the number of species in some research areas, namely *pennales Navicula* (8) species table (2)

Table 2. List of phytoplankton species identified in the study site

Month	Novembr			December			Jun			march			April			may		
Siteion species	St 1	St 2	St 3	St 1	St 2	St 3	St 1	St 2	St 3	St 1	St 2	St 3	St 1	St 2	St 3	St 1	St 2	St 3
Cyanophyceae																		
chroocaccus minutas	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C.pallidus	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lyngbya aeruginosa	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oscillatoria articulata	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O.subbrevis	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phormidium tenue	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Spirulina mjor.Kuetzing	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Euylenophyceae																		
Epitheria sp	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	+	+
Euhlena polymorpha	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacillariophyceae																		
Centrales																		
Coscinodiscus sp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+
Cyclotella comta (Fhr.) Kutz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Melosira. ambigua . O.Muller	-	-	-	-	-	-	+	+	+	+	+	+	+	-	-	+	+	+

Pennales																		
Amphiprora alata . Kutz	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
A. costata .Kutz	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
campylodiscus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+
Cocconies placentula . Ehr.	-	-	+	-	-	-	+	+	-	+	+	+	+	-	+	+	-	+
Cymatopleura solea.(de Brebisson)W. smith	+	-	-	-	-	-	+	+	+	+	-	+	+	+	+	+	+	+
Cymbella affinis. Kutz	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C.cistula(Hemp rich)Gum	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. helvetica	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diplonies elliptica	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-
Fragillaria capucina. Demazieres	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. corotensis . Kitton	+	+	-	+	-	-	+	+	+	-	+	+	+	-	+	-	-	-
F. intermedia Grunow	-	+	-	+	+	+	+	+	+	-	-	-	-	-	+	-	-	-
F. virescens Ralfs	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Gyrosigma acuminatum. (Kutz.)	+	-	+	+	+	-	+	+	+	-	-	+	+	+	+	-	+	+
G. angustatum	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-
G. spencerii. (w. smith)	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Navicula.cincta var. houfleri Grunow	+	+	-	-	-	-	+	+	+	+	+	+	+	+	+	-	-	-

N. cryptocephala Kuetzing	-	-	-	-	-	-	+	-	-	-	-	+	-	-	+	+	+	+
N. elementis	-	-	-	-	-	-	+	+	+	+	+	-	-	+	+	-	-	-
N. oevmii	+	+	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
N.radiosa var. tenella (Breb) Grunow	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N. viridula	+	+	+	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-
N.vsclesvicencis	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitzschia acicularis. w. smith	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
N. fusciculata	-	-	+	+	-	-	-	-	-	-	-	-	-	+	-	+	+	-
N. longissima. (Brebisson) Ralfs .	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
N. sigma.(Kutz)w.smith	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-
N.tryblionella	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N. vermicularis. (Kutz . Grum .	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
pinularia viridis	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Rhoicosphena marina.(W.SM) M. Schmidt. curvata	-	-	+	-	-	-	+	+	+	+	+	+	+	-	+	-	-	-
Stauroneis anceps Ehrenberg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
Surirella robusta robust	-	+	-	+	-	+	+	-	-	-	-	+	-	+	+	+	+	+
Synedra acus. Kutz	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-
S.tabulate.Agar dh. Kutz	+	-	-	-	+	-	+	-	-	-	-	-	-	+	-	-	-	-

((+s species present, - species not found))

The results show that the three location had the most species, with 34 species belonging to 21 genera, while the frist site had the fewest, with 19 species belonging to 32 gene

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