



Recording Eight New Species of Algae Iraqi Aquatic Environment within the Tigris River in the City of Baghdad- Iraq

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Abstract At first time in Iraq, Eight species was diagnosed in a river of Tigris, these new species belong to Seven genus alga is represented by *Bacillosiphon* sp. , *Bacillosiphon induratus* , *Katagnymene spiralis* and *Cylindrocapsa geminella*, under division of green algae, as well alga *Nostochopsis* sp. which belong to division of Blue green algae, and algal *Pleuroopsis* sp, *Stauroneis pygmaea*,. under the division Bacillariophyta under order of Pennales, these new species belong to *Chrysidiastrum catenatum* ,under division of Chrysophyta.the *Bacillosiphon* sp. have a tubular shape, branched with a thick and clear sheath, vegetative body of alga formed from multi cells with intracellular distance with multi geometrical shapes among cells, the alga *Nostochopsis* sp. which is characterized by its divided filamentous shape, with un completed branches, each branch is short and small, has a rounded end, while the shape of alga *Pleuroopsis* sp. distinguished with three cubes connected to one of the corners of the other cells, also contain high concentration of silicate which forming internal alga skeleton. Chemical tests referred to conditions which help growing of these algae represented by Nitrate NO_2 reached 16.8 mg/l, Ammonia concentration NH_4 22.4 mg/l, Conductivity 2.75 mS/cm, Total Dissolved Suspended TDS 1239 mg/l in neutral pH ranged from 6.9 to 7.6, the blooming of these Eight species between spring and summer especially the algal *Nostochopsis lobatus* which was bloomed during summer season in high temperature according to highly biomass.

Keywords species, recording, diagnosed, division and green algae

Introduction

Phycology specialized with study of a group of simple microorganisms, autotroph, Does not rise to the level of variation in archegonia plants, unicellular or multicellular, low in differentiation, absorbs nutrients through surface of the body. The word algae originate from the Latin word for seaweed and are now applied to a broad assemblage of organisms that can be defined both in terms of morphology and general physiology [1]. Sizes of algae are different; some of them never seen just with microscopes and the others are so long like many meter such as seaweeds. [2]. Most of algae lives in both aquatic environments freshwater, brackish and salty waters, some of them found on the rocks and tree trunks, also found in soil and hummed walls because algae absorb water and Carbon di Oxide (CO_2) from the surrounding environment [3]. Algae most commonly occur in water, be it fresh water, marine, or brackish. However, they can also be found in almost every other environment on earth, from the algae growing in the snow of some American mountains, lichen associations on bare rocks, desert soils, or hot springs. In most habitats they function as primary producers in the food chain which producing organic material from sun light, carbon dioxide, and water [4]. Although algae used as biomarkers for many types of pollutants, algae considered as a pollutants [3]. Also used for estimation ecological conditions at aquatic environment [5]. At last decades, many small rivers become large, according the results modifications of hydro chemical compositions and algae in waters take place .So monitoring studies of the current ecological state of waters surfaces, which got a high levels of pollutants determined by increasing of a quantity for several



Ions like ammonium ions, nitrites, nitrates, phosphates, phenols, micro elements and petrol compounds [6]. The Phytoplankton are chlorophyll bearing suspended microscopic organisms consisting of algae with representatives from all major taxonomic groups. The majority of members belong to Chlorophyceae, Cyanophyceae, Chrysophyta and Bacillariophyceae. Their unique ability to fix inorganic carbon to build up organic matter through primary production makes their study a subject of prime importance. The phytoplankton community on which whole aquatic population depends is largely influenced by the interaction of number of physico-chemical factors. The present study aimed to register new types of aquatic environment as a result of the Iraqi environmental changes therein.

Materials and Methods

Diagnosis of algae

Modified solid media of Chu-10 [6-7] after pouring in sterilized petri dishes left to harden for using them in differentiation. Several drops of sample taken from sample and spread on surface of harden media. After that, dishes placed at controlled conditions day: light 16:8 hours with intensity 245 Microeinstein/m²/s and temperature 25±2 °C for a period from 7-10 days at luminous incubator connected to solar energy unit for 24 hour. Growth of algae was monitored continuously by light microscope by transferring a parts of different algal colonies to another new petri dishes contains modified media of chu-10, then left in same conditions for getting pure cultures [8]. This process is frequent until getting pure unialgal culture [9]. Then a part of colony moved after making sure of the fact that a colony for one species of algae to the liquid media Chu-10 in conical flasks size volume 250 ml at sterilized conditions, then placed at same growing conditions at in the beginning of the experiments for two weeks for getting Compatible growing conditions, Pure unialgal culture [10]. Then a part of colony moved after making sure of the fact that a colony for one species of algae to the liquid media Chu-10 in conical flasks size volume 250 ml at sterilized conditions, then placed at same growing conditions at in the beginning of the experiments for two weeks for getting Compatible growing conditions. Liquid cultures examined and monitored to make sure they are free from other species of algae. Algae diagnosed according to diagnosis references [2] and [11] by using composite light microscope. Also been relying on [12] in the process of classifying algae.

Study area

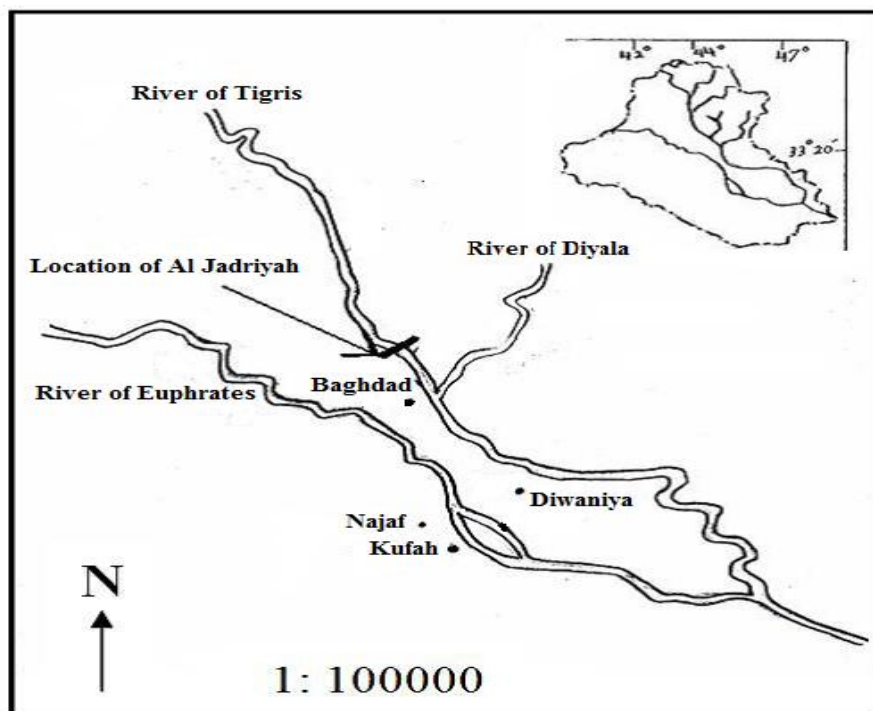


Figure 1: The map of study area represented by location of Al Jadriyah located on the Tigris River



Study area located at AlJadriyah apart from a city Baghdad, this area is free of industrial activities on Tigris river near university of Baghdad (small area nearly 16 – 24 m²), this area chose for natural phenomenon of bio adhesion which not to be under the control of any urban effects and activities. Figure (1) showed sample locations.

Physical and chemical tests

- Water temperature of water: measured locally by graduated thermometer from 0-100 C° [13].
- pH: measured by pH meter, pH meter calibrated by calibration solutions (pH 4, 7 and 9) [13].
- Electrical Conductivity: measured by Conductivity meter measured values recorded as $\mu\text{S} / \text{cm}$ [14].
- Salinity: measured depending on results of electrical conductivity of samples by using following equation, results recorded as ppt (%).

$$\text{Salinity } \% = \text{electrical conductivity} - 14.78 / 1589.08. [13]$$

- Determination of Nitrate NO₃.

For determination of NO₃, the adopted method of American health association [15], was used by taking 50 ml of water sample and filtered in order to remove suspended materials, then added 1ml of Hydrochloric acid (1 M), and mixed well, then the concentration of NO₃ was measured by Spectrophotometer at wavelength 220 nm. A result was considered with unit mg / l.

Results and Discussion

Characterization of diagnosed algae at first time in Iraq.

Bacillosiphon sp.: This alga have branched tubular shape, with thick and clear sheath.

B. induratus: have branched tubular shape, with thick and clear sheath, vegetative body of *B. induratus* formed from multi cellular with intercellular space between cell, and the others with multi geometrical shapes.

Division: Chlorophyta

Class: Chlorophyceae.

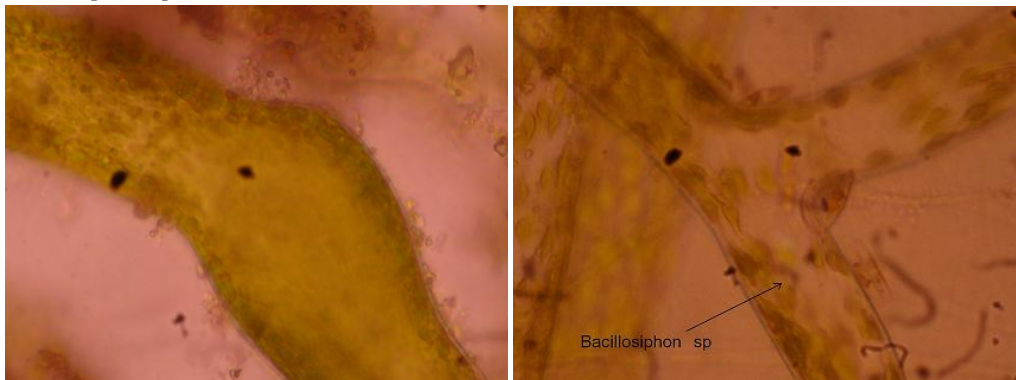
Order: Cladophorales.

Family: Cladophoraceae.

Genus: *Bacillosiphon*.

Bacillosiphon induratus

Bacillosiphon sp



Bacillosiphon sp.

Bacillosiphon induratus

Nostochopsis lobatus: shape characterized as filamentous alga, divided, with many uncompleted branches, each branch is short, and have a rounded end.

Division: Cyanophyta.

Class: Myxophyceae.

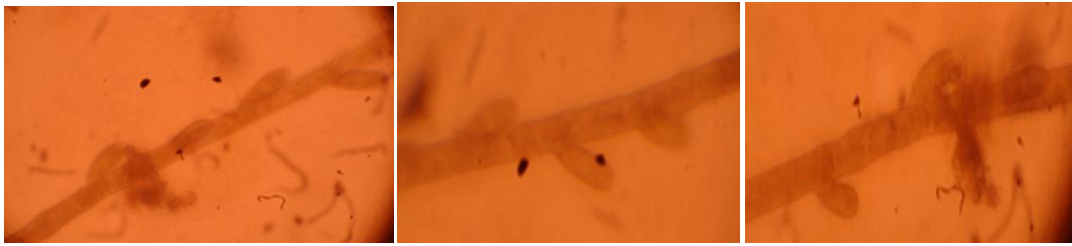
Order: Hormogonales.

Family: Nostochopsidaceae .Geitler.

Genus: *Nostochopsis*

Nostochopsis lobatus



*Nostochopsis lobatus*

***Pleuopsis* sp:** Characterized as three cubes, connected from one angle of the cell with the other one, reached with high concentration of silicate which forming internal alga skeleton.

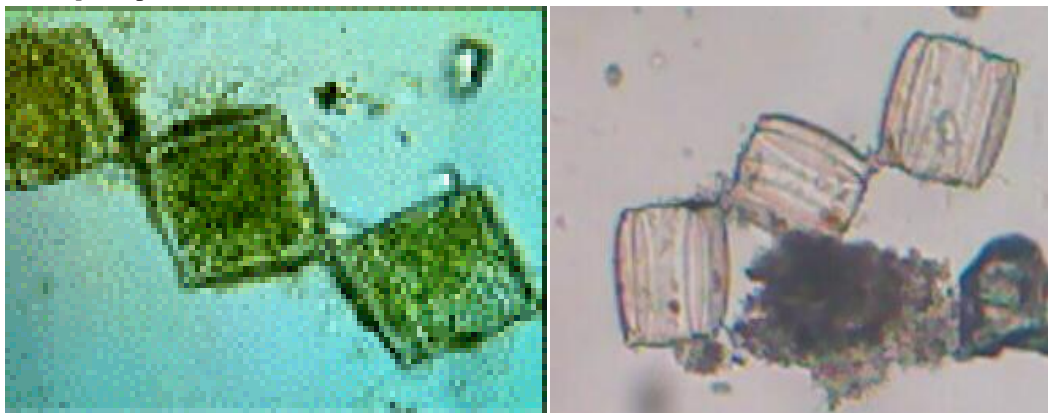
Division: Chrysophyta.

Class: Bacillariophyceae (Diatoms)

Order: Pennales.

Genus: *Pleuopsis*

Pleuopsis sp

*Pleuopsis* sp.

Katagnymene spiralis

Filamentous; solitary trichomes or (extraordinary) small clusters of several trichomes, free-floating or free-living among other algae. Trichomes rarely straight, usually irregularly coiled up to screw-like coiled, 10-30 μ m wide, usually with a limited growth, rarely long and multicelled, simple, uniseriate, unbranched, without firm sheaths, but enveloped by a wide, colourless, sometimes diffuent mucilaginous envelope; trichomes at the ends not attenuated or only with few (-5) last cells slightly narrowed, sometimes with calyptra, at the cross walls constricted or unconstricted. Trichomes immotile, easy disintegrating into motile hormocytes (or with indistinct, slow and interrupted trembling without envelopes). Cells always shorter than wide, shortly cylindrical or barrel-shaped, without or with aerotopes (planktic species); thylakoids irregularly coiled with reticular arrangement through the cell. Heterocytes and akinetes absent. Cells divide by the crosswise fission, all cells capable to divide (but sometimes within short division zones), with the exception of apical ones. Division of trichomes in more or less constant distances, by a help of a special intercellular discs. Fragmented trichomes remain sometimes chain-like connected by their ends, by rests of intercellular discs. Reproduction by a total disintegration of trichomes. Hormocytes germinate at both ends (isopolar).

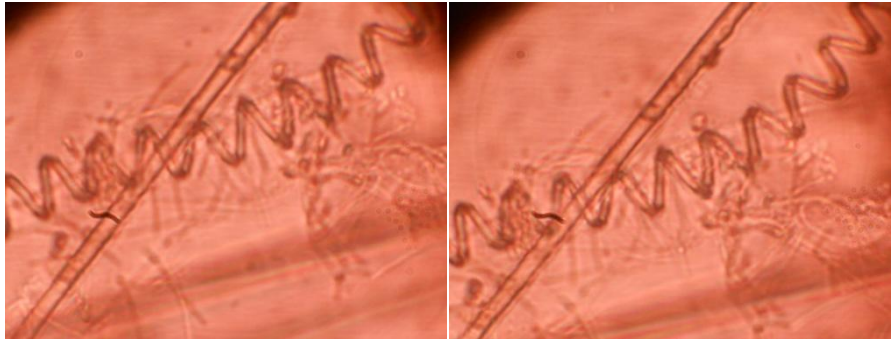
Division: Chlorophyta

Class: Chlorophyceae.

Genus: *Katagnymene*.

Katagnymene spiralis





Katagnymene spiralis

***Stauroneis pygmaea*:** Valves has very little convex edges, ends rostrate capitate has pth. Ion lations 17- 24 μm , larger 4 - 6 microns fine striations about 30 in 10 μm impercep tiblement pitted. Stauros reetangulaire, droit.petite raphe species are encountered recently in tourbeu um pond near the holy Chapella laud (maine-et-Loire) perhaps for the first time in frauce.

Division: Chrysophyta.

Class: Bacillariophyceae (Diatoms).

Order: Pennales.

Genus: *Stauroneis*.

***Chrysidiastrum catenatum*:** Cells amoeboid, without loric as adjoined in loose linear series by their long ,thin pseudopodia. Characters as described for the genus,cells 12 - 15 μ in diameter without processes ,45 - 60 μ wide in cluding processes. Rare,in euplankton of several lakes. Wis. Cells globose, free- floating with delicate pseudopodia, joined by radiating processes to form linear colonies of 2 – 16 in dividuals, Chromatophore a central plate or band.

Division: Chrysophyta.

Class: Chrysophyceae.

Order: Rhizochrysidales.

Family: Rhizochrysidaceae.

Genus: *Chrysidiastrum*.



Chrysidiastrum catenatum

***Cylindrocapsa geminella*:** Filaments long composed of ovate or oblong cells that are up to twice their diameter in lengthy in capious lamellate mucilage .chloroplast massive and usually obscured by starch grain. Cell 12-18 μ in diameter18- 30 μ long .oogoniaglobose or pyriformglobose as much as 50 μ in diameter (including the gelationous sheath), usually in series of 3-9 this species is usually found entangled. Among other filamentous



algae, especially abundant in desmid habitats, such as acid swamps. It is more common than other species of the genus in our collection Mich Wis.

Division: Chlorophyta.

Class: Chlorophyceae.

Order: Cylandrocapsales.

Family: Cylandrocapsaceae.

Genus: *Cylandrocapsa*.



Cylandrocapsa geminella

Table 1: Shows most important conditions that diagnosed algae at first time in Iraq was grow.

NO₃ mg / L	NH₄⁺ mg / L	Sal ‰	EC mS/cm	TDS Mg/L
16.8.	22.4	0.2	2.75	1239

These kinds of new algal undiagnosed from the rest of the studies, research and even another list of the types of algae by [16] which recorded 2647 type have not been diagnosed with these types and even the rest of the algal menus studied by many researchers in the research centers and university professors and Atarih and messages Graduate Studies undiagnosed these eight species, and these algal species present in the Tigris river environment within the city of Baghdad.

In addition even in the study (17), which recorded a 263 species of different algae Baghdad also did not register these species, some of which are toxic, as in algae *Nostochopsis* sp. a return to the algae Blue green for the which contain one of the types of toxins such as Neurotoxins, Hepatotoxins, Pyriproxifen, Emodin, Cytotoxins That have been detected study (18).

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