## Abstract

The current study was conducted in five selected positions variety of human activities along the agricultural project named (Beat zwana River) located in Jadedat- alshat, within the province of Diyala, for the period from October 2013 until June 2014, the study included measurement of twenty-two physiochemical factors of river water environment, as well as to study the quality and quantity of community phytoplankton, has also been applied in the study a number of environmental indexes.

The range of studied properties were: 10.83 -38.75°C and 9.17 -28.5°C for air and water temperature, water depth (16.50 - 284.33 cm), light penetration (14.50 - 152cm) , turbidity (0.27-106.98) NTU, electrical conductivity, EC,(514.83 - 1027.5) µS/cm , salinity (1.15-4.88 part per thousand), total dissolved solids, TDS (287.83- 861.6) mg/l and total suspended solids TSS (2-49.87) mg/l, pH (6.25- 7.98), dissolved oxygen, DO (3.65- 11.25)mg/l and Biological Oxygen Demand. $BOD_5$ (1.07- 4.35) mg /l, total alkalinity, TA (115.33- 178.5 ) mg /l, total hardness, TH ( 221.83- 338.83) mg/l, Calcium, Ca (52.08-101.36) mg $CaCO_3$/l, and Magnesium ,Mg (74.62- 177.89) mg $CaCO_3$ /l**,** Nitrate $NO_3$(1.55- 6.55) mg /l, effective phosphate $PO_4$ (0.02 - 4.16) mg/l, Sulfate, $SO_4$ (131.5- 283) mg/l ,effective Silicate (4-2.10) mg/l, , Chlorophyll -a, ( 0.12- 28.02) and Phaeophytin-a, (0.85- 25.93). *m*g/l, respectively.

Results of the present study showed that most of the studied characteristics and private (Salinity, EC, TH, $PO_4$, $BOD_5$, Turbidity, TDS , Ca and Mg) were of an influential or higher rates when comparing the permissible limits environmentally overall used properties of water for irrigation or aquaculture or for human consumption, according to recommendations of WHO, FAO Organization, as well as the Iraqi specifications for the river water, which shows that human activities in the region significant effect on water and environment of project.

The number of phytoplankton algae that have been diagnosed in this study reached 200 species belong to 72 genera, within nine classes of the following basic algae **Bacillariophyceae, Chlorophyceae, Cyanophyceae, Euglenophyceae, Raphidophyceae, Dinophyceae, Chrysophyceae, Xanthophyceae, and Cryptophyceae.** The diatoms algae formed the largest percentage, as record them 131 species belong to 28 genus, and consisting 65.5%, followed by chlorophyceae 30 species belonging to 22 genus and 15%, then Cyanophyceae,22 species, to 10 genus and 11%, followed by algae Euglenophyceae 8 species belonging to 3 genus and 4%, then Cryptophyceae 3

species ,to 3 genus and 1.5%, while all of the Xanthophyceae and Dinophyceae recorded 2species belonging to 2 genus and 1%, and finally the Chrysophyceae and Raphidophyceae, found them 1 species belong to 1 genus and 0.5%. Also the results showed that the distribution and biodiversity of diagnosed phytoplankton at the level of the sites, It was found that there is different for each classes from the ranks of the algae, as recorded presence in the first site 90 species belonging to 43 genus, and at the site-2, 50 and 35 genus, and in site-3, 68 species and 38 genus, 66 species belonging to 38 genus in site-4, while presence 127 species belonging to 45 genus at site-5.

The quantitative study of phytoplankton in the lower and the higher ranges at the five sites ( S1, S2, S3,S4 and S5) of the study area respectively recorded the following values, (1780-7246 , 300 - 8180 , 220 - 2950, 560-3020 and 540- 6860 cells /ml, and rates generally each site respectively, as well as 2923.6, 2027.0, 871.1, 1344.4 and 2324.6 cells/ml. when comparing the amount of algae that have been counted, we find that the highest 2923.6 rate cells/ml scored St-1 and less than the rate of 871.1 cells/ml record in S3.

In the current study we were able to record six new genus and species after checking with (Checklist of algal flora in Iraq, 2014) and consisted of these algae to:

*Westella linearis* G. M. Smith, *Navicula goppertiama* Bourrelly .1981, *Oedogonium minus* (Wittr.) Witrock 1875. *Gonyostomum seme* Geitler, *Gomphoniuma capitum.* Bourrelly .1981, *Phcus tourus (lemm.)* skvortzow 1928.

Also in the current study, many ecological indices were used and represented as follows: Richens index (Marglef index (1968), Similarity index (Sorenson index- 1942), Difference index (Bray and Curtis index, 1957), Presence index depended on (Chandler, 1970) and Shannon Weaver index for diversity, To evaluate the relationship between the sites and the quantity and quality of algae studied and water quality. The highest value for richness 16.246, recorded ta S5 and the highest value of the similarity 0.849 was between S1 and S5, the highest value of the difference 0.491 recorded among of S4 and S5, the highest amount of the presence of his record genus *Navicula spp* from pennales diatoms, feather at the level of individuals in the sample, as recorded following him to the species *N. goppertiana* and *N. cryptocephala* 3200 and 2356 cell/ml in October and November in 2013, while the highest value of diversity 1.878, by Shannon Weaver index recorded in S4. This gives an indication of the variation in the quality of water and nutrients and a physiochemical factors that lead to growth provides supportive conditions and

the spread of some species and a specific one for some of phytoplankton during the months of the year and different locations**.**

On the basis of diversity index values, that was between 1.03-1.878 as less and higher, can be considered waters of the five sites between light pollution to medium pollution, and classified all within the second water category according (Wilhm guide- 1975). And this gives a conclusion no matter what the view that the water agricultural project environment (Beat- Zwana River) may be directly affected by human activities practiced by the population as well as other environmental impacts experienced by the entire region from various external and internal factors pollutants.