Journal of Physics: Conference Series

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To cite this article: Ahmed Mahmoud Falih-Al-Khalidi and Raid Kadhim Abed Al-Asady 2019 *J. Phys.: Conf. Ser.* **1294** 072023

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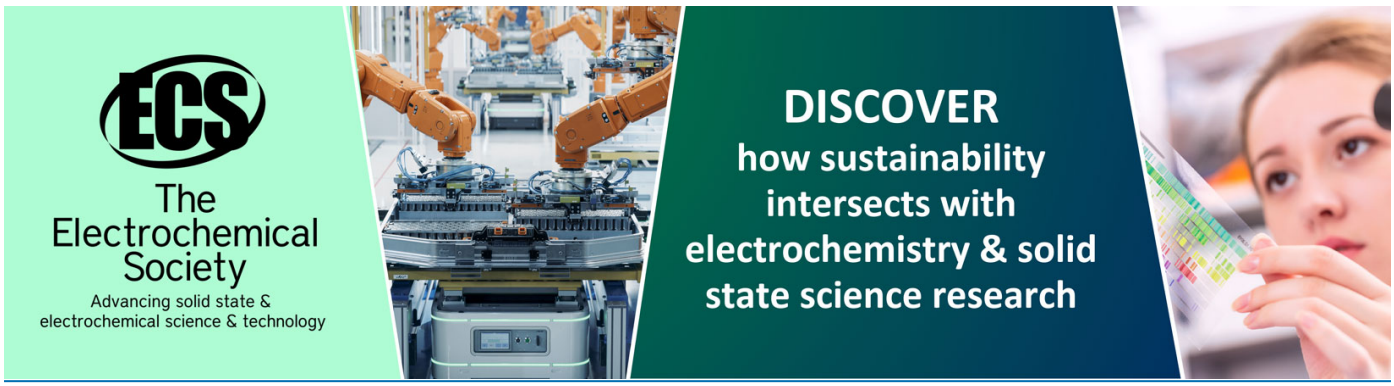

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Spatial, seasonal variation and biodiversity in phytoplankton communities in Al-Diwaniyah River -IRAQ

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Abstract . Identification and diversity of Phytoplanktons was studied in five sites in the River of Al-Diwaniyah – Iraq during the period from January 2018 to December 2018. A total of 224 taxa belonging to 66 genera were diagnosed in all study sites. Atotal of 224 taxa were identified in all stations of study and dominated by diatoms (120 taxa).pennales were represented by 107 species only , and 13 species belong to Centrales diatoms followed by green algae recorded 54 species and then blue green 42 species. Euglenophyta recorded 6 species, while the Pyrrophyceae was one species .It was also notice that few genera were dominated namely,*Oscilltoria* spp. , *Scendesmes* spp., *Cocconies placentula*, *Cyclotella meneghiniana*, , *Melosira ambigua*, *Navicula cincta* ,*Synedra acus*, during the period of the study in all stites.. The highest density of phytoplankton was recorded during the month of April, at 2918.4 × 310 cells / liter, and the lowest density at site (3) during the month of January was 278.3 × 310 cells / liter. Shannon -Weiner for Diversity showed the highest value in Site (1) at 3.66 during April and the lowest value on site (3) in February and reached 1.19.

Keywords: Phytoplankton , Identification, diversity, Diwaniyah river **,** Shannon –Weiner**.**

Introduction :

Phytoplankton plays a key role in the food chain in the water. It processes photosynthesis through which nutrients and carbohydrates are produced, which are used in metabolism or are often stored in the form of starch or oils, so algae in general and phytoplankton in particular are the primary products in many Water systems are one of the main sources of fish feed, larvae and other aquatic organisms such as crustaceans and molluscs, which are important sources of food for humans [1]. Because phytoplankton is considered an important food for many biota in the aquatic environment, so it has received attention and study by many researchers of different types of water bodies, Several studies have been conducted in the Iraqi water bodies in the environment of phytoplankton. The studies of the phytoplankton community have found the diatomate in Iraqi water and these studies [2] .In the Tigris pointing out that the density of phytoplankton in the Tigris River is lower than in the Euphrates River [3] studied the phytoplankton in the Tigris River before and after the city of Baghdad.While [4, 5]. studied Non - diatomic algae in the Tigris River. The density of phytoplankton studied in the Euphrates river between the Indian dam and the Kefal and recorded 145 species, most of which belonged to the diatoms[6]. The study of the quantitative and qualitative composition of phytoplankton is a good indicator of water quality [7] .The high abundance of chlorophyta is a good

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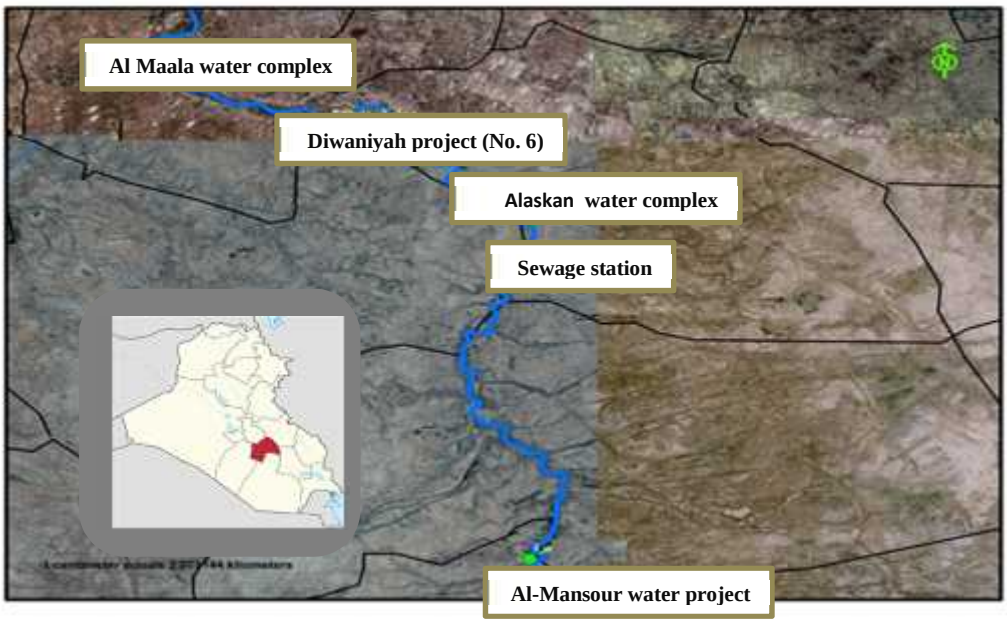
indicator of high water productivity [8] .Blue green algae also causes a number of water problems, including the release of toxic chemicals, changing the taste and smell of drinking water due to the death of phytoplankton [9] .This study was conducted with the aim of identifying phytoplankton in the Diwaniyah River, studying it in quality and quantity, as well as knowledge of seasonal and local changes, and identifying the most abundant species.

Material and Methods:

The Diwaniyah River is one of the main and important rivers in the Diwaniyah province, which is one of the branches of the River Hilla, which is in turn a branch of the Euphrates River . During the current study, five stites were selected along the river's water stream in Diwaniyah city, where the first station was located at Al Saniya of Diwaniyah governorate near the water complex (Al Maala) (N = 32 ° 00'77.5 "E = 44 ° 86 ' 61.1 "), the second station is located north of the city of Diwaniyah within the water purification plant Diwaniya project (N = 31 ° 96'27.5": E = 44 ° 94'81.6 "). The third station was in the drinking water complex (N = 31 ° 94'82.1 ": E = 44 ° 96'94.8 ') while the fourth station in the south of the city of Diwaniya near the sewage station (N = 31 ° 72' 92.2 ": E = 44 ° 96'80.8"). The fifth station was in Al-Hamzah area within the Al-Mansour water project (N = 32 ° 05'18.89 "E = 44 ° 77'55.28").(Figure 1).

The phytoplankton net mesh size 20µ used to collect samples from selected sites .Algae sample was then prepared to be ready for counting as mentioned in [10, 11]. The phytoplankton species are identified by a number of taxonomic sources, most notably [12 ,13, 14].Depending on the diversity of life depending on Indicator Shannon -Weiner for Diversity [15 , 16]as follows:

H=-∑ni/N χ Ln (ni/N) **ni =** Numbe of individuals of species **N=** Total number of individuals



(Figure 1): the map of the study sites

Results and discussion:

The number of diagnosed species of Phytoplankton was 224 species, belonging to 66 genera. The Diatoms Bacillariophyceae was the biggest part of it as it formed 120 species of 27 genera any rate (54 %), followed by green algae 54 species belonging to 23 genera (24 %) and blue green algae 42 species belonging to 12 genera(19 %) then Euglenophyceae 6 species belonging to both sexes(3%), while algae Pyrrophyceae were less algal groups registered as belonging to the one species (0.44%)(Figure 2). Some types of phytoplankton existed in most of the duration of the study, including , *Oscilltoria* spp. , *Scendesmes* spp,*Cocconies placentula, Cyclotella meneghiniana, Fragilaria capucina , Melosira ambigua, Navicula cincta ,Synedra acus.*

The results of the study showed that the first site has recorded the highest number of species, as 160 species belong to 52 genera, while the fourth site has recorded the lowest number of species, as 132 species of 51 genera(Table 1). The highest number of Phytoplankton was 2918.4 cells $*10^{3}$ / liter in April for the first site, while the lowest number reached 278,343 cells $*10^{3}$ / l in January for the third site(Figure 3). The results of the statistical analysis indicate of significant differences between different months, as well as between sites.

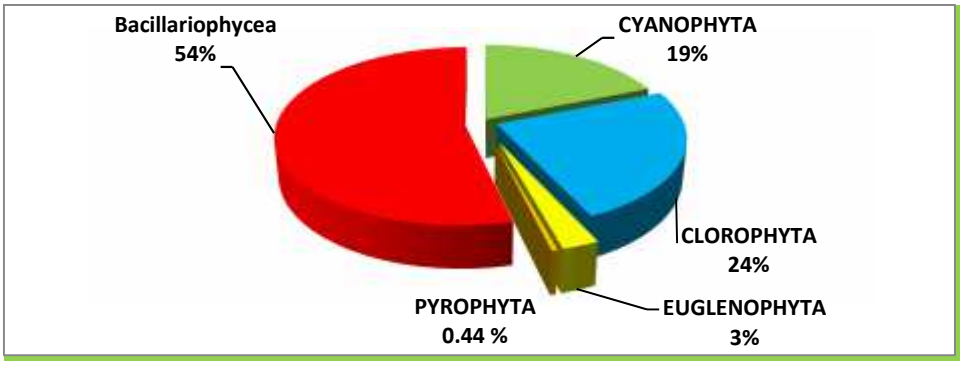


Figure 2 : Percentage of phytoplankton species in study sites

The Increment in phytoplankton may be due to the variability in the abundance of plant nutrients where the first site is located within agricultural land , This is what makes the river water receive the water from the agricultural faeces in which it is put in addition to what is to be removed from human waste to the river, increasing the concentration of plant nutrients. The decrease in the number of phytoplankton species may be due to the large number of contaminants in the river water as a result of untreated wastewater and the waste of textile plant [17] .Some phytoplankton may not have the same ability to grow and resist in the water surface when exposed For difficult environmental conditions [18] .In addition, the exposure of phytoplankton from contaminants and grazing and the way they receive nutrients is an important reason for the different types of species both locally and monthly [19].

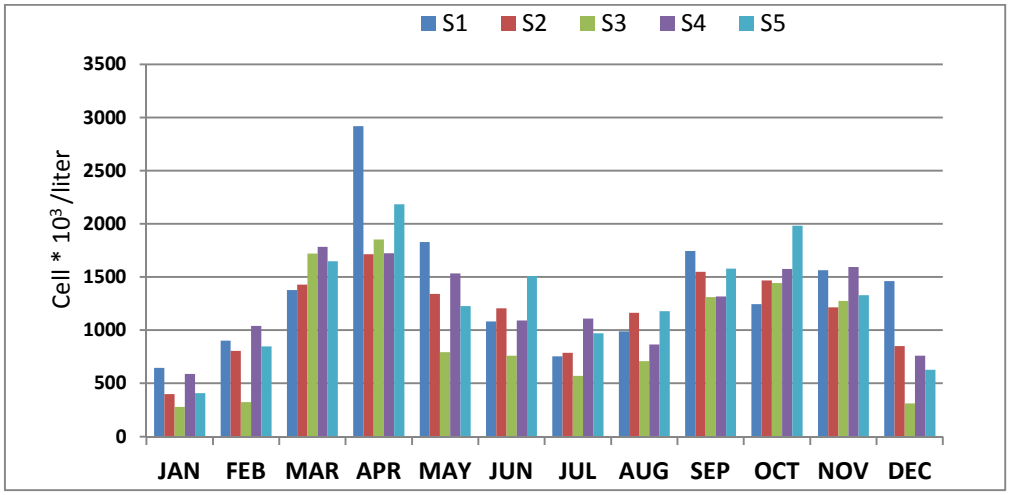


Figure 3: Monthly and local changes in algal growth rates at study sites

The current study showed that the lowest value of the Shannon-Weiner index was 1.19 at the third site for February, while the highest value of the index was 3.66 in the first site of April (Figure 4). The results of the Shannon-Weiner Scale showed values of more than 1 indicating that the river water in Diwaniyah is well diversified and that its water is moderately polluted [20].As the environmental conditions in the waters of the Diwaniya River are appropriate in the study sites, including the physical and chemical factors to increase the values of biological diversity due to the increase in the number and diversity of phytoplankton[17].Thus, the availability of favorable conditions in the spring months of increased light permeability, availability of nutrients, growth of phytoplankton growth and appropriate temperature have played an active role in the higher value of the Shannon-Weiner Guide [21 , 22]. The results of the statistical analysis indicate of significant differences between different months, as well as between sites.

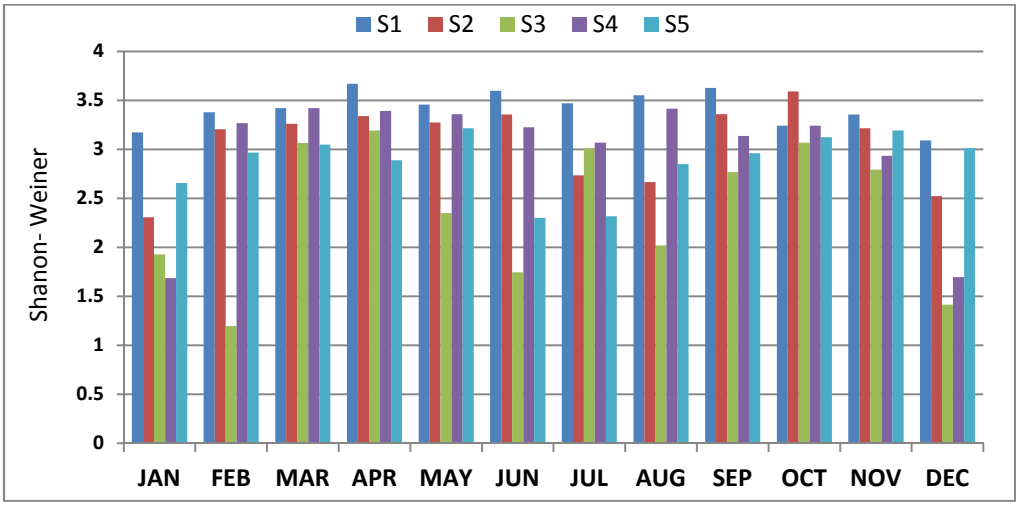


Figure 4 : Monthly and local changes of values Shannon – Weiner of phytoplankton

Table 1 : Total number of phytoplankton (cell* 10^3) during study in Diwaniyah River

Taxa	First Station											
	2018											
	Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.
CYANOPHYTA												
Anabaena flos- aquae (Lyng.)Debrebisson		-	-			12.98	-	-	-	-	-	-
Aphanocapsa littorals Hansgirg	25.97	-	-	-	-	-	12.98	-	25.97	-	-	-
Calothrix Sp.		12.98				12.98						
Chroococcus dispersus (Keissl)Lemmermann		-	-	-	-	-	25.97	25.97	-	-	-	-
Chroococcus pallidus Naegeli		-	25.97	-	-	-	38.96	-	-	-	-	-
C. minutes (Ktz.)Naegeli		12.98	-	25.97	-	-	-	-	25.97	-	-	-
Lyngbya aestuarii Lemmermann		-	-	103.8	-	64.93	-	38.96	-	25.97	-	-
L.major Meneghini			38.96								25.97	
Lyngbya sp.	12.98						12.987			25.97		
Merismopedia elegans A.Braun		-	77.922	-	-	-	-	12.98	-	-	-	-
*M. glauca(*Ehr.) Naegeli						25.97		25.97				
Microcystis aeruginosa Kuetzing		-	-	168.83	12.98		38.96	-	25.97	103.9	-	12.98
Oscillatoria amphibia Agardh			25.974									25.97
O. amoena (Ktz.) Gomont					25.98			25.97				
O. chalybea Mertens						12.98						
O. curviceps Agardh		12.98	-	38.96	-			-	77.92	-	-	-
O. limnetica Lemmermann	12.98	-	-	-	25.97	-	-	-	-	12.98	-	-
O.limosa Roth Agardh		-	-	207.79	-		-	12.98	-	-	25.97	-
O.princeps Agardh		-	12.98	-	-	-	-	-	25.97	-	-	-
O. tenuis Agardh		12.98	25.97	-	-	-	-	-	-	38.96	-	-
O. anguina		-	-	-	-	-	-	-	12.98	-	-	-
O. angusitssimum		-	-	77.92	-	-	38.96	-	-	-	-	-
O. minima	12.98	-	-	-	-	-	-	-	-	-	-	-
Phormidium Fragile (Menegh.)Gomont.		-	155.84	129.87	90.9	-	-	12.98	-	12.98	-	-
*P. tenue (*Menegh)Gom.		38.96	-	-	-	25.97	-	-	-	-	-	-
Phormidium Sp.		-	25.97	-	-	-	38.96	-	-	-	12.97	-
Spirulina Laxa G.M.Smith		-	-	-	12.98	-	-	12.98	-	-	-	-
S. menenghiniana		-	-	-	-	-	-	-	25.97	-	-	-
CLOROPHYTA												
Actinastrum hantzschii Lagerhein		12.98	38.96	155.84	194.8	38.96	-	77.92	90.9	-	25.97	181.8
Chlamydomonas snowiae Printz		-	-	-	-	-	-	-	-	12.98	-	-
Chlamydomonas epiphytic G.M Smith		-	-	-	-	-	-	-	12.98	-	-	-
Chlorella vulgaris Bejerinck		-	-	-	-	-	-	-	12.98	-	-	-
*Cladophora fracta (*Dillw)Kuetzing		-	25.97	-	-	-	12.98	-	-	-	-	-
Cladophora glomerata Kuetzing	12.98	-	12.98	64.93	-	12.98	-	-	90.9	-	-	12.98
Coleochate sp.	12.98	-	-	-	-	-	-		12.98	-	-	-
Cosmarium botrytis Meneghinii		25.97	12.98	-	-	-	-	-	-	-	25.97	-
Crucigenia apiealata		-	-	38.96	-	-	-	12.98	-	25.97	-	12.98
Gonium pectoral Mueller		-	-	-	-	-	12.98	-	25.97	-	-	-
Hyrodictyon reticulatum (L.)Lagerheim		12.98	-	-	-	25.97	-	-	-	-	-	-
Mougeotia Sp.	12.98	-	-	-	-	-	-	-	-	-	-	-
Pandorina morum Bory.		-	-	-	-	38.96	-	-	-	-	12.98	-
Pediastrum. boryanum (Turp.)Meneghini		-	-	25.97	-	-	12.98	-	-	-	-	-

P. duplex Meyen		-	-	-	-	12.98		-	-	38.96	-	12.98
P. simplex Meyen		25.97	12.98	-	-	-	-	12.98	38.96	-	-	12.98
*Scenedesmus aboundans (*Kirch)Chodat		-	-	-	-	25.97	12.98	-	12.98	-	-	-
Scenedesmus acuminatus (Lag.) Chodat		-	-	-	38.96	-	-	-	-	12.98	-	-
S. arcuatus Lemm.		-	103.89	-	-	-	-	-	25.97	-	-	-
S. brasiliensis Bohlin		-	-	-	-	-	-	38.96	12.98	-	-	25.97
S.bijuga (Turb.)Lagher		25.97	-	-	-	38.96	-	12.98	12.98	-	12.98	-
S. longus Meyen		-	-	-	-	-	12.98	-	-	-	-	-
S. obligus (Turb.)		-	-	-	-	25.97	38.96	-	38.96	-	-	-
S. quadricauda (Turb.)de Brebisson		25.97	-	64.93	38.96	-	-	-	-	-	-	-
S. quadricauda var maximus West and West		-	-	-	-	38.96	12.987	-	-	12.98	-	-
S. quadricauda var westii		12.98	-	25.97	38.96	-	-	-	-	-	-	12.98
S. serratus (Corda) Bohlin		-	-	-	-	12.98	12.987	-	25.97	-	-	-
Selanastrum gracile (Reinsch)Korsch	25.97	-	-	-	-	-	-	-	-	12.98	-	-
Spirogyra fluviatilis Hilae		12.98	12.98	90.9	-	38.96	-	25.97	64.93	-	25.97	12.97
Spirogyra sp.		-	-	-	12.98	-	-	-	-	-	-	-
Strastrum gracile Ralfs	12.98	-	12.98	12.98	25.97	-	25.97	-	-	-	38.96	-
Tetradron caudautm Hansgirg		-	-	-	-	12.98	-	-	-	-	-	-
Tetradron trigonum Hansgirg		-	-	-	-	-	-	25.97	-	-	-	-
Ulothrix subtilissima Rabenhorst		-	-	-	-	-	-	-	-	-	12.98	-
Euglenophyta												
Euglena acus Ehrenberg.				12.98							25.97	
E. gracilis Klebs.								12.98				
Phacus orbicularis Huebner			25.98									25.97
P. caudate Huebner							12.98					
Bacillariophycea												
Centrales												
Aulacoseira ambigua O. Muller		8.97	-	71.76	44.85	-	-	-	-	-	26.91	-
A. distans (Ehr.) Kuetzing	8.97	-	-	-	-	44.85	17.94	-	-	17.94	-	-
A. granulata (Ehr.) Ralfs		-	26.91	17.94	80.73	-	-	-	-	-	35.88	-
A. italica (Ehr.) Ralfs		-	-	-	-	-	26.91	-	-	-	-	-
Cyclotella comta (Fhr.) Kutz		98.76	-	-	224.2	-	71.76	26.91	-	-	-	134.5
C. meneghiniana Kuetzing		98.67	53.82	44.85	206.3				44.85	26.91	188.3	98.67
C. ocellata pantocsek		-	-	17.94	44.85	-	-	17.94	2.91	-	53.82	-
*Melosira granulate (*Ehr.)Ralfs		-	-	-	-	-	-	-	-	-	-	80.97
*Melosira distance (*Ehr.) Kuetzing.		-	-	80.73	-	35.88	17.94	-	-	8.97	-	17.94
Stephanodiscus astrea (Ehr.) Gran.		26.91	-	-	-	-	-	-	17.94	-	-	-
Stephanodiscus hantzschii Grunow		-	-	26.91	-	-	-	35.88	-	-	107.6	-
Pennales												
*Achnanthidium affine (*Grunow) Czarnecki		-	-	-	-	-	-	26.91	-	17.94	-	-
A. conspicua A. Mayer		-	-	-	-	8.97	17.94	-	44.85	-	-	35.88
A. Microcephala (Kuetzing)Grunow	8.97	-	17.94	-	-	-	-	-	53.82	-	-	-
A.mintussima Kuetzing		-	-	44.85	-	-	-	89.7	-	-	107.6	134.5
Amphiprora alata . Kutz		26.91	-	-	-	-	-	-	-	-	44.85	17.94
Amphiprora coffeaeformis (Agardh)			26.91					8.97	80.73			71.76
Amphora normanii Rabh		-	-	71.76	-	17.94	26.91	-	-	-	-	-
Asterionella Formosa Hass.		-	-	-	-	-	-	-	-	8.97	-	-
Bacillaria paxillifer (Muell.) Hendey.	98.67	-	-	53.82	-		17.94	-	-	116.6	53.82	107.6
Caloneis bacillum (Grun.)		-	-	-	-	-	-	-	17.94	-	-	-

Cleve.												
C.ventricosa (Ehr.) Meister.					17.94			8.97				-
Cocconeis pediculus Ehrenberg		26.91	-	107.64	35.88	-	-		71.76	44.85	17.94	-
C. placentula Ehrenberg		-	62.79	35.88	-	-	-	17.94	98.67	-	116.6	-
*C. placentula var. euglypta(*Ehr.) Cleve	152.4	161.4	44.85	17.94	26.91	35.88			89.7	80.73	107.6	161.4
*C. placentula var . lineate (*Ehr.) Cleve	98.76	71.76	-	8.97	-	17.94		35.88	-	-	98.67	125.5
Cymatopleura elliptica (Breb.) W.Smith.		-	17.94	-	-	-	-	-	44.85	-	-	8.97
*C.solea (*Berb.) W.Smith.		-	-	17.94	-	-	-	35.88	-	-	-	-
Cymbella affinis Kuetzing.		-	17.94	-	-	-	-	-	-	-	-	-
C. caepitosa		-	-	-	-	-	-	26.91	-	-	-	-
*C. cistula(*Ehr..) Kirchn		-	-	8.97	-	-	-	-	-	-	-	-
C. gracilis(Rabh .)Cleve	17.94	-	-	-	26.91	-	-	-	-	-	-	-
C. helvetica Kuetzing		-	-	-	-	8.97	-	-	-	-	-	-
C. obtusiuscula (Kutz.)Grun		-	-	-	-	-	-		-	-	-	8.97
C .parva (W.Smith) Kitchn		-	-	-	-	-	8.97	-	-	-	-	-
C. perpusilla A.cleve.		-	-	-	-	-	-	-	-	17.94	-	-
C. tumida(Bréb.)V. Heurck		-	-	-	-	-	-	17.94	-	-	-	-
C. ventricosa (Greg.) Cleve		-	-	-	-	17.94	-	-	-	-	-	-
Diploneis ovalis (Hilse) Cleve.		-	17.94	-	-	-	-	-	-	-	-	-
Fragilaria brevistriata Grunow		-	-	8.97	-	-	-	-	-	-	17.94	-
F. capucina Desmazieres		-	-	-	26.91	-	17.94	-		-	-	-
F. construens Grunow		-	-	-	-	-	-	8.97	26.91	-	-	-
F. crotonensis Kiton.		17.94	-	-	-		8.97	-	-	-	8.97	-
F. intermedia Grunow		-	-	-	17.94	-	-	-	-	17.94	-	-
Gomphonema acuminatum Her.		-	-	-	-	-	-	17.94		-	-	-
G. olivaceum		-	-	17.94	-	-	-	-	-	-	8.97	-
G. gracile Ehrenberg.		-	-	-	-	-	8.97	-	-	-	-	-
G. intricatum Kuetzing	8.97	-	26.91	-	-	-	-	-	-	-	-	-
G. intricatum var. lunata nov.		-	-	17.94	-	-	-		-	-	-	26.91
G . sphaerophorm		-	-	-	17.94	35.88	-	-	26.91	53.82	-	-
*Gyrosigma acuminatum(*Ktz.) Rabenhorst	17.94	-	-	35.88	-	-	-	-	17.94		-	8.97
G. attenuatum(Ktz.) Rabenhorst		26.91	-	8.97	-	-	-	17.94	-	-	-	-
G. peisonis Hustedt	8.97	-	-	-	-	-	-	-	-	-	-	-
*Navicula lanceolata (*Ag.) Kuetzing.		-	17.94	-	-	-	-	-	-	8.97	-	-
N. cincta (Ehr.)Kuetzing		-	44.85	80.73	17.94	26.91	17.94	26.91	35.88	-	-	8.97
N. creptocephala Kuetzing	8.97	-	62.79	-	35.88	-	-	-	53.82	-	17.94	-
N. dicephala W.Smith		17.94	17.94	44.85	71.76	-	-	-	-	-	-	-
N. fusca Greg		-	-	-	-	-	-	-	17.94	-	-	-
N. gibbula Cleve		-	-	-	-	8.97	-	-	-	-	-	-
N. gracilis		-	35.88	80.73	-	-		-	-	53.82	-	17.94
N. graciloides A.Mayer		-	-	-	-	-	-	8.97	-	8.97	-	-
N. gregaria Donkin		-	-	-	-	8.97	-	-	-	-	-	-
N. gastrum (Ehr.) Kuetzing.	8.97	-					-	-		-	-	-
N.halophila (Grun.) Cleve.		-	-	-	17.94	35.88	-	-	71.76	-	-	-
*N.radiosa var. tenella (*Breb.) Grunow.		-	17.94	44.85	26.91	-	17.94	-	-	-	35.88	-
N. rhynchocephala Kuetzing		17.94	-	-	-		-	-	17.94	-	-	8.97
N. schroeteri Meister		-	17.94	-	-	-	-	-	-	26.91	-	-
Nitzschia acicularis. W. smith .		-	-	-	-	-	-	17.94	-	17.94	-	-
N.apiculata (Greg.) Grunow		-	-	44.85	116.6	-	-	-	-		-	-
N. cluasii Hantzsch		-	-	-	-	35.88	-	-	17.94	-	-	-
N. dissipata. (Kutz) Grun .	17.94	-	-	71.76	98.67			26.91		143.5	107.6	-

N. fasciculate Grunow		-	-	-	-	17.94	-	-	-	-	17.94	-
N. fruticosa . Hustedt .		-	-	-	-	-	-	8.97	80.73	-	-	-
N. gracilis Hantzsch		-	17.94	-	-	-	17.94	-	-	-		-
N. granulata Grunow		-	-	-	-	116.6	-	-	-	-	26.91	-
N. hungarica Grunow		-	-	-	17.94	-	-	-	8.97	-	-	-
N. intermedia. Hustedt .		-			-	-	-	17.94	-	17.94	-	-
N. obtusa W. Smith		-	-	-	-	-	8.97	-	-	-	-	-
N. palea (Ktz) W. Smith		26.91	25.97	-	-	-	17.94	8.97	80.73	-	71.76	-
N.paleacea Grunow		8.97	-	25.97	-	17.94	-	-	-	-	-	-
N. puctata(W. Smith) Gruonw	8.97	-	-	103.89	17.94	-	-	-	-	35.88	-	-
N.pusilla Kuetzing		-	38.96		8.97	-	-	-	-	-	-	17.94
N. sigma.(Kutz) w. smith .		-			-	-	-	26.91	-	-	17.94	-
N. sigmoidea. (Ehr.) w. smith .	8.97	8.97	53.82	-	-	17.94	-	-	-	26.91	-	-
N.umbonata (Ehernberg) Lange-Bertalot		-			17.94	-	-	-	-	-	-	-
N. vermicularis (ktz) Hantzsch		-	-	168.8	-	35.88	26.91	-	-	-	-	8.97
Pinnularia . sp.		-	17.94		-	-	-	-	-	-	-	-
Pleurosigma angulatum W.Smith		-			17.94	-	-	-	-	8.97	-	-
Rhoicosphenia curvata (Ktz.) Grunow.		8.97			-	35.88	-	17.94	17.94	-	26.91	-
Surirella. robusta Ehr.		-	-	38.96	26.91	-	-	-	-	44.85	-	-
Synedra acus Kuetzing	17.94	-	-	-	44.85	-	26.91	-	-	17.94	-	8.97
S. ulna. (Nitzsche.) Ehr.	8.97	-	-	207.7	-	-	-	17.94	-	80.73	-	-
S.vaucheria Kuetzing		-	8.97	-	-	17.94	-	-	-	-	-	-
	645.2	901.6	1378.3	2918.4	1829	1081.	753.36	990.6	1744.	1243	1565.	1463

Second station

CYANOPHYTA	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**July**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**
Anabaena affinias Lemmermann.	-	12.987	-	-	25.974	-	-	-	-	-	12.987	-
A. flos- aquae (Lyng.)Debrebisson	-	-	-	38.961	-	90.909	-	25.97	-	38.961	-	-
Aphanocapsa littorals Hansgirg	-	-	-	-	-	-	25.97	-	12.987	-	-	-
Calothrix Sp.	25.974								12.987			
Chroococcus dispersus Lemmermann	-	-	-	-	25.974	-	-	38.96	-	12.987	-	-
Chroococcus var. minor GM.Smith	-	-	-	77.922	-	-	-	-	-	-	-	-
Chroococcus pallidus Naegeli	-	-	51.948	-	-	-	12.98	-	-	-	-	-
C. minutes (Ktz.)Naegeli	-	-	-	-	-	38.961	-	-	12.987	-	12.987	-
Lyngbya aestuarii Lemmermann	12.974	-	-	-	51.948	-	-	12.98	-	-	-	-
Lyngbya limnetica Lemmer	-	-	-	25.974	-	-	-	25.97	-	77.922	-	12.987
L.mesotrica Skuja	-	-	-	-	-	12.987	-	-	-	-	-	-
Lyngbya sp.		12.987							38.961			
Merismopedia elegans A.Braun	-	-	38.961	90.909	-	-	25.97	-	-	-	-	12.987
M.minima Heck	-	-	-	-	12.987	-	-	-	-	-	-	-
M. punctata Heyen						25.974	12.98		25.974	12.987		
Microcystis aeruginosa Kuetzing	12.987	-			64.935	-	25.97	38.96	-	25.974	-	12.987
Oscillatoria amphibia Agardh		12.987			25.974						12.987	
O. articulata Gardner	-	-	77.922	25.974	-	51.948	12.98	-	-	-	-	12.987
O. curviceps Agardh	12.987	-	90.90	-	25.97	-	-	77.9	38.961	12.98	-	-

			9		**4**			**2**		**7**		
O. limnetica Lemmermann	-	-	**25.974**	-	**12.987**	-	-	-	**12.987**	-	-	-
O.limosa Roth Agardh	-	-	**90.909**	-	-	-	-	**25.97**	**51.948**	-	**12.987**	-
O.princeps Agardh	-	-	-	-	-	**12.987**	-	-	-	**25.987**	-	-
O.subbervis Schmidle	12.987	-	-	-	-	**38.961**	**25.97**	-	**77.922**	-	-	-
O. anguina	-	-	-	**25.987**	-	-	-	**12.98**	-	-	-	**12.987**
O. angusitssimum	-	-	-	-	-	**25.987**	-	-	-	-	-	-
O. splanidida	-	-	-	-	-	-	**25.97**	-	-	-	-	-
O. sp	-	-	-	-	-	-	-	-	-	-	-	**12.987**
*Phormidium Fragile (*Menegh.)Gomont.	-	**12.987**	**77.922**	-	-	-	-	-	**168.83**	-	-	-
P. tenue (Menegh)Gom.	-	-	-	**38.961**	-	**142.85**	**25.97**	-	-	-	-	-
Spirulina Laxa G.M.Smith	-	**12.987**	-	-	-	-	-	-	-	**38.961**	-	-
S.major Ktz.	-	-	-	-	**12.987**	-	-	-	-	-	-	-
CLOROPHYTA												
*Actinastrum falcatus (*Corda) Ralfs	-	**12.987**	**25.974**	-	-	**12.987**	-	**25.97**	-	**12.987**	-	-
Chlamydomonas epiphytic G.M Smith	-	-	-	-	**12.987**	-	-	-	-	-	-	-
Chlamydomonas sp.	-	-	-	-	-	-	**12.98**	-	-	-	-	-
Cladophora glomerata Kuetzing	12.987	**25.974**	-	-	-	**12.987**	**64.93**	**51.94**	-	-	-	-
Closterium parvalum Naegeli	-	-	-	**12.987**	-	-	-	-	-	-	-	-
Coleochate sp.	-	-	-	**12.987**	-	-	-	-	-	-	-	-
Cosmarium botrytis Meneghinii	-	-	-	**25.974**	-	-	-	**12.98**	-	**12.987**	-	**12.987**
Crucigenia tetrapedin	-	-	-	-	-	-	-	**12.98**	-	-	-	-
Hyrodictyon reticulatum Lagerheim	-	-	-	-	-	-	-	-	-	-	**12.987**	-
Microspora loefgrenii Lagerheim	-	-	-	-	-	-	-	-	-	-	-	**25.974**
Pandorina morum Bory.	12.987	-	-	-	-	-	-	-	-	-	-	-
Pediastrum integram Naegli.	-	**12.987**	-	**25.974**	-	-	-	**12.98**	-	-	-	-
P. duplex Meyen	-	-	-	-	-	**12.987**	**25.97**	-	-	-	-	-
P.sculptatum G.M.Smith	-	**12.987**	-	-	-	**38.961**	-	-	-	-	-	-
P. simplex Meyen	-	-	-	-	-	-	-	-	**25.974**	-	-	-
*Scenedesmus aboundans (*Kirch)Chodat	-		-	-	-	-	-	-		-	-	**12.987**
Scenedesmus acuminatus (Lag.)	-		-	-	-	-	-	-	**12.987**	-	**25.974**	-
S. arcuatus Lemm.	-	-	-	-	-	-	-	-	**12.987**	-	-	-
S. brasiliensis Bohlin	-	-	-	-	**12.987**	-	-	-	**25.974**	-	-	-
S.dimorphus (Turb.)Ktz.	-	**12.987**	-	-	-	-	-	-	-	-	-	-
S. obligus (Turb.)	-		**12.987**	-	**12.987**	-	-	**25.97**	-	-	**25.974**	-
S. quadricauda (Turb.)de Brebisson	-	-	-	-	**77.922**	-	-	-	-	-	-	-
S. quadricauda var maximus West and West	-	-	-	-	-	-	-	**90.90**	-	-	**12.987**	-
S. quadricauda var westii	-	-	-	-	-	-	-	-	-	-	-	**12.987**
S. serratus (Corda) Bohlin	-	**12.987**	-	-	-	-	-	-	-	-	-	-

Selanastrum gracile (Reinsch)Korsch	12.987	-	-	-	-	-		-	-	-	-	-
Selanastrum sp.	-	-	-	-	-	-	25.97	-	-	-	-	-
Spirogyra fluviatilis Hilae	-	-	38.961	64.935	-	12.987	-	12.98	25.974	-	-	-
S. proticalis (Muell.)Petit.	-	-	25.974	-	-	-	12.98	-	12.987	-	-	-
Strastrum gracile Ralfs	12.987	-	-	38.961	12.987	-	25.97	-	12.987	12.987	-	12.987
Stigeoclonium attenutum Collins		-	-	-	-	-	-	38.96	-	-	-	12.987
Tetradron trigonum Hansgirg	-	-	-	-	-	-	-	-	-	-	25.974	-
Euglenophyta												
Euglena acus Ehrenberg.											12.987	
E. minuta						12.987						
Bacillariophycea												
Centrales												
Aulacoseira granulata (Ehr.) Ralfs	17.94		-	-	-	53.82	-	35.88	17.94	-	35.88	17.94
A. italica (Ehr.) Ralfs		17.94	-	-	35.88	-	53.82	-	-	44.85	44.85	-
Cyclotella comta (Fhr.) Kutz	-	-	-	-	-	-	-	62.79	-	-	-	-
C. meneghiniana Kuetzing		17.94	62.79	-	26.91	-	35.88		-	-	35.88	26.91
C. ocellata pantocsek		26.91		35.88						17.94		
Melosira ambigua O.Muller	-	-	62.79	53.82	53.82	-		-	44.85	17.94	26.91	-
*M. granulate (*Ehr.)Ralfs	-	17.94	17.94	-	17.94	-		-	-	-	17.94	26.91
M. distance (Ehr.) Kuetzing.	-	-	-	-	-	-	-	53.82	-	-	-	-
Stephanodiscus astrea (Ehr.) Gran.	-	-	-	-	-	-	17.94		35.88	-	44.85	-
S. hantzschii Grunow	-	26.91	-	17.94	-	-	-	-	-	-	17.94	-
Pennales												
Achnanthidium conspicua A. Mayer	-	-	26.91	-	-	-	8.97	-	17.94	-	-	-
A. delicatula (Ktz.) Grunow	-	-	-	-	26.91	-	-	-	-	-	-	-
A. Microcephala (Kuetzing)Grunow	-	17.94	-	17.94	-	-	-	-	-	-	-	-
A.mintussima Kuetzing	-	-	-	-	-	-	-	-	-	-	8.97	-
Amphiprora alata . Kutz	26.91	-	17.94	-	-	26.91	17.94	-	17.94	-	-	-
Amphora normanii Rabh	-	-	-	-	-	-	26.91	-	-	-	-	-
A. veneta Kuetzing.	-	-	-	-	35.88	-	-	17.94	-	-	-	-
Asterionella Formosa Hass.	-	-	-	17.94	-	-	-	-	-	-	-	-
Bacillaria paxillifer (Muell.) Hendey.	-	-	-	-	17.94	-	-	-	-	26.91	35.88	-
*Caloneis bacillum (*Grun.) Cleve.	-	-	-	-	-	-	-	17.94	-	-	-	-
Cocconeis pediculus Ehrenberg	-	17.94	53.82	80.97	-	35.88	-	-	26.91	71.76	53.82	
C. placentula Ehrenberg	-	-	89.7	80.73	98.82	-		-	-	-	26.91	-
*C. placentula var. euglypta(*Ehr.)		53.82	35.88	17.94	-	17.94	17.94		26.91	116.61	179.4	
C. placentula var . lineate (Ehr.)	-	-	-	71.76	62.79	-	-	-	-	98.67	116.61	80.73
Cymatopleura solea W.Smith.	-	-	-	26.91	-	-	-		17.94	-	17.94	-
Cymbella affinis Kuetzing.	-	-	26.91	-	-	17.94	-	-	-	35.88	-	-
C. caepitosa	-	8.97	-	-	17.94	-	-	-	-	-	-	-
C. cistula(Ehr..) Kirchn	-	-	26.91	-	-	-	-	17.94	-	-	-	-

C. gracilis(Rabh .)Cleve	-	-	-	-	-	-	-	-	17.94	-	-	17.94
C. helvetica Kuetzing	-	-	35.88	53.82	-	-	-	-	-	-	-	-
C. perpusilla A.cleve.	-	-	-	-	-	-	-	17.94	-	8.97	-	-
C. tumida(Bréb.)V. Heurck	-	-	-	-	17.94	35.88	-	-	35.88	-	-	-
C. ventricosa (Greg.) Cleve	-	-	17.94	-	-	-			-	-	-	-
Diatoma elongtoma Agardh	-	-	26.91	-	-	-	26.91	-	35.88	-	-	-
D. hiemale var. mesodon	-	-	-	-	-	26.91	-	-	-	-	-	-
D. vulgare Bory	17.94	35.88	17.94	26.91	-	-	17.94	26.91		44.85	-	17.94
Diploneis ovalis (Hilse) Cleve.	-	-	-	-	-	-	-	-	35.88	-	-	-
Fragilaria brevistriata Grunow	-	-	-	-	-	35.88	-	-	17.94	-	-	-
F. capucina Desmazieres	-	26.91	17.94	44.85	-	-	35.88	53.82	-	-	17.94	-
F. construens Grunow	-	-	-	-	26.91	-	-	-	-	-	-	-
F. intermedia Grunow	17.94	-	-	35.88	-	-	-	-	-	44.85	-	-
Gomphonema acuminatum Her.	-	-	-	-	-	-	17.94	-	17.94	-	-	-
G. angustatum (Ktz)Rabe.	-	71.76	-	44.85		17.94		35.88		-	90.67	107.64
G. olivaceum	-	-	17.94	-	-	-	17.94	17.94	35.88	44.85	-	-
G. gracile Ehrenberg.	-	-	-	-	-	-	-		17.94	-	-	-
G. intricatum Kuetzing		-	-	-	-	-	-	-	17.94			
G. intricatum var. lunata nov.	26.91	-	-	-	-	-	-	-	53.82	62.79	44.85	80.73
Gyrosigma acuminatum(Ktz.)	17.94	26.91	-	26.91	-	-	17.94	-	17.94	-	-	-
G. attenuatum(Ktz.) Rabenhorst	8.97	-	8.97	-	17.94		-	-	-	-	17.94	-
G.spenceri var. nodifera Grunow.	-	-	8.97	-	-	-	-	-	-	-	-	-
Mastogloia Smithii	-	-	-	-	-	-	-	-	-	-	17.94	-
Navicula angilica Ralfs	-	-	-	44.85	-	-	-	-	-	-	-	-
N. angilica var. subsulsa	-	-	53.82	-	-	-	-	-	-	17.94	-	-
N. lanceolata (Ag.) Kuetzing.	17.94	-	-	-	-	-	-	-		-	-	-
N. cincta (Ehr.)Kuetzing	-	-	62.97	98.67	-	53.82	-	-	-	53.82	-	17.94
N. creptocephala Kuetzing	-	17.94	35.88	-	-	-	-	-	-	17.94	-	-
N. decussis Oestrup	-	-	-	-	17.94	-	-	-	-	-	-	-
N. gibbula Cleve	8.97	-	-	-	-	-	-	17.94	-	-	26.91	-
N. gracilis	-	-	-	-	-	-	17.94	-	-	-	-	-
N. graciloides A.Mayer	-	-	-	35.88	-	-	-	-	-	-	-	-
N. gregaria Donkin	-	-	8.97	-	-	-	-	-	-	-	-	-
N. gastrum (Ehr.) Kuetzing.	-	-	-	-	-	-	-	-	-	8.97	-	-
N.halophila (Grun.) Cleve.	-	-	-	-	-	-	-	-	-	-	-	17.94
N.radiosa var. tenella Grunow.	35.88	26.91	-	89.7	125.58	179.4	-	-	161.46	53.82	-	17.94
N. rhynchocephala Kuetzing		-	-	-	-	-	-	-	-	-	62.79	-
N. schroeteri Meister	-	-	-	-	-	17.94	-	-	-	-	-	-
Neidium affine (Ehr.) Pfitz.	-	-	-	-	-	-	-	35.88	-	-	-	-
Nitzschia acicularis. w. smith .	-	17.94	17.94	-	17.94	-	-	-	-	8.97	-	-

N.apiculata (Greg.) Grunow	-	-	-	-	-	-	-	-	-	-	-	17.94
N. dissipata. (Kutz) Grun .	26.91	-	-	62.61	-	-	35.88	53.82	80.55	-	26.91	-
N. filiformis. (W. smith) . Hustedt .	-	-	-	-	-	26.11	-		-	44.85	-	-
N. fruticosa . Hustedt .	-	-	26.91	-	-	-	-	-	-	-	-	-
N. gracilis Hantzsch	8.97	-	-	-	-		-	44.85	-	17.94	26.91	17.94
N. hungarica Grunow		17.94	-	-	-	-	-	-	-	-	-	-
N. intermedia. Hustedt .	-	-	-	-	-	-	17.94		-	-	-	-
N. linearis W. Smith	-	-	-	-	-	-	-	-	17.94	-	-	-
N. longissima (Breb.) Ralfs	-	-	-	26.91	-	8.97	-	-	-	-	-	8.97
N. palea (Ktz) W. Smith	-	-	-	-	53.82	-	35.88	-	62.79	80.73	-	44.85
N.paleacea Grunow	-	-	-	38.961	35.88	-	-	17.94	8.97	-	-	-
N. puctata(W. Smith) Gruonw	-	35.88	-	-	-	17.94	-	-	17.94	-	-	44.85
N. sigmoidea. (Ehr.) w. smith .	17.94	-			-	-	-	-	-	44.85	-	-
N. tryblionella Hantzsch	-	-	-	-	44.85	-	-	-	-	26.91	-	-
N. vermicularis (ktz) Hantzsch	-	-	-	77.922	-	17.94	-	-		-	-	-
Pinnularia borealis Ehr.	-	-	51.948	-	-	-	-	-	-	17.94	-	-
P. sp.	-	-	-	-	-	8.97	-	-	-	-	-	-
Rhoicosphenia curvata Grunow.	17.94	-	-	-	26.91	-	8.97	-	-	-	26.91	-
Surirella angusta Kuetzing	-	17.94	-	25.974	-	-	-	-	-	-	-	-
S. robusta Ehr.		62.79	-	-	17.94	26.91	17.94		17.94	-	-	35.88
Synedra acus Kuetzing	-	-			-	-	-	-	-	80.73	35.88	-
S. ulna. (Nitzsche.) Ehr.	-	98.67	38.961	90.909	179.4	125.58	-	116.6	98.67	107.64	-	80.73
Total	398.95	806.63	1429.9	1714.9	1341.5	1207.2	786.1	1165.	1548.9	1466.6	1215.2	850.55

Third Station

CYANOPHYTA	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**July**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**
Anabaena affinias Lemmermann.	-	-	-	12.987	-	-	-	12.987	-	-	-	12.987
Aphanocapsa littorals Hansgirg	-	-	-	-	-	12.987	-	-	-	-	12.987	-
Chroococcus dispersus (Keissl)Lemmermann	-		-	-	-	-	25.97	-	-	12.987	-	-
Chroococcus var. minor GM.Smith	-	-	155.84	-	-		12.98	-	77.92	-	-	
C. minutes (Ktz.)Naegeli	12.987	-	-	-	12.987	-	-	25.974	-	-	-	-
C. turgidus (Ktz.)Naegeli	-		-	12.987	-	12.987	-	-	-	-	-	-
L.mesotrica Skuja	-	-	-	-	-	-	25.97	-	35.88	-	-	-
Merismopedia. glauca(Ehr.) Naegeli	-	-	-	-	-	-	-	38.961	-	-	-	12.987
M.minima Heck		-	12.987	-	-	-	-	-	-	-	25.974	-
Microcystis aeruginosa Kuetzing	-	-	12.987	-	-	-	-	-	-	51.987	-	-
Oscillatoria amphibia Agardh	-	-	-	-	25.974	-	12.98		12.98	-	-	-
*O. amoena (*Ktz.) Gomont	-	12.987	-	-	-	12.987	-	51.987	-	-	-	-
O. articulata Gardner	-		-	25.974	-	-	-	-	-	-	44.85	-
O. chalybea Mertens	-	-			-		-	-		-	-	
O. curviceps Agardh	-		-	-	25.974	-	12.97	-	-	129.87	-	-

O. limnetica Lemmermann	12.987	-	-	12.987	-	25.974	-	-	-	12.987	-	-
O.limosa Roth Agardh	-	-		142.85	-	-	-		-		-	-
O.princeps Agardh	-	-	25.974	-	12.987	-	-	-	12.98	-	-	
O. tenuis Agardh	-	-	-	12.987	-	12.987	-	70.922	-	-	-	-
O. angusitssimum	-	-	12.987	-	12.987	-	-	-	-	-	38.961	-
O. minima	25.974	-	-	-	-	-	-	-	-	-	-	-
P. tenue (Menegh)Gom.	-	-	38.961	-	-	25.974	-		12.98	-	-	-
CLOROPHYTA												
Actinastrum gracilimum G.M.Smith	-	-	-	-	-	-	-	-	-	12.987	-	-
Actinastrum hantzschii Lagerhein	-	12.987	25.974	-	-	12.987	12.98	25.974	38.96	-	12.987	-
A.falcatus(Corda) Ralfs	-	-	-	-	12.987	-	-	-	-	12.987	-	-
Chlamydomonas epiphytic Smith	-	-	-	12.987	-	-	-	-	-	-	-	-
Cladophora glomerata Kuetzing			-	-	-	-		-	-	-	-	25.974
Closterium parvalum Naegeli	-	-	-	-	12.987	-	12.98	-	-	-	-	-
C.depresum Lundell	-	-	-	25.974	-	-	-	-	-	-	25.974	-
Crucigenia fenestrate Schmidll	-		25.974	-	-	-	-	12.987	12.98	-	-	-
Crucigenia tetrapedin	-	12.987	-		-	-	-	-	-	-	-	
Gonium sp.	-	-	-	12.987	-	-	-	-	-	-	-	-
Mougeotia Sp.	12.987	-	-	-	-	-	-	-	-	-	-	-
Pediastrum integram Naegli.	-	12.974	-	-	-	12.987	25.97	-	38.96	-	-	-
P .boryanum (Turp.)Meneghini	-	-	-	-	12.987	-	-	-	-	-	-	-
P.sculptatum G.M.Smith	25.974	-	-	-	-	-	-	-	-	-	-	12.987
P .simplex Meyen	-	-	-	-	-	-	-	64.935	-	-	-	-
Odegonium gracillius (Wittr.)Tiffany	-	-	-	-	-	-	-	-	12.98	-	-	-
Oocystis borgei Snow.	-	12.987	-	-	-	-	-	-	-	-	-	-
Scenedesmus aboundans Chodat	-		-	-	-	-	25.97	12.987	-	12.987	-	
Scenedesmus acuminatus Chodat	-	-	12.987	-	-	-	-	12.987	-	-	-	-
S.bijuga(Turb.)Lagher	-	-	25.974	-	-	-	12.98		-	-	12.987	-
S .obligus(Turb).	12.987	-	-	25.974	38.961	-	-	-	-	-	12.987	-
S.quadricauda var longispina(Chodat)G.M. Smith	-	12.987	-	-	-	-	-	12.987	25.97	38.961	-	-
S .quadricauda var westii	-	-	-	-	-	25.974	12.98	-	-	-	-	-
Selanastrum gracile (Reinsch)Korsch	-	-	-	-	12.987	-	-	-	-	-	-	12.987
Selanastrum sp.	-	-	12.987	-	-	-	-	12.987		-	38.961	-
Spirogyra fluviatilis Hilae	-		-	-		-	12.97		25.97	-	-	-
Strastrum gracile Ralfs	-	-	-	38.961	12.987	-	12.98	-	-	-	-	-
Stigeoclonium attenutum Collins	-	-	-	-	-	-	-	-	-	12.987	-	25.974
Tetradron caudautm	25.974	-	-	-	-	12.98	-	-	-	-	-	-

Hansgirg						7						
Tetradron trigonum Hansgirg	-		-	-	-	-	38.96	-	-	-	25.974	-
Tetradron muticum (A.Braun.)Hansg.	-	-	25.974	-	-	-	-	-	-	-	-	-
Ulothrix subtilissima Rabenhorst	-	12.987	-	-	-	-	-	-	-	-	-	
Euglenophyta												
Euglena acus Ehrenberg.							25.97					
E. gracilis Klebs.			12.987								12.987	
Phacus orbicularis Huebner							12.98					
Bacillariophycea												
Centrales												
A. distans (Ehr.) Kuetzing	8.97	-	-	-	-	-	17.94	-	26.91	-	-	-
A. granulata (Ehr.) Ralfs	-		44.85	-	53.82	80.73	-	62.79	-	35.88	-	-
Cyclotella comta (Fhr.) Kutz							17.94					35.88
C .meneghiniana Kuetzing	35.88		161.46	53.82			17.94		17.94	-	107.64	-
C. ocellata pantocsek	35.88	44.85	71.76		26.91					17.94		
Stephanodiscus hantzschii Grunow	-	-	-	62.79	-	-	17.94	-	98.67	-	-	-
Pennales												
Achnanthidium conspicua A. Mayer	-	-	-	-	-		17.94	-	-	-	44.85	-
A. Microcephala (Kuetzing)Grunow	-	-	98.67	-	71.76	215.28	-	-	161.4	-	-	-
A.mintussima Kuetzing	-	8.97	-	116.61	-	-	-		98.67	71.76	-	-
Amphiprora coffeaeformis (Agardh)	17.94	-	17.94	44.85	-	-	17.94	8.97	26.91	-	-	
A. ovalis Kuetzing	-	-	26.91	-	-	-	-	8.97	44.85	-	17.94	-
Asterionella Formosa Hass.	-	-	35.88	-	-	-	-	-	-	143.52	-	17.94
Bacillaria paxillifer (Muell.) Hendey.	-	-	-	26.91	-	-	35.88	17.94	17.94	-	-	-
Cocconeis pediculus Ehrenberg	17.94	-	-	-	-	-	-	-	-	44.85	98.67	-
C. placentula Ehrenberg	-	8.97	-	116.61		-	-	-		143.52	89.7	-
C. placentula var. euglypta(Ehr.)			29.61	17.94	17.96	8.97			143.5	8.97		
C. placentula var . lineate (Ehr.)	-		-	116.61	-	-	-	-	44.85	80.73	179.4	17.94
Cymatopleura.solea W.Smith.		17.94	-	17.94	8.97	-	8.97	17.94	-	35.88	17.94	-
Cymbella affinis Kuetzing.	-	-	-	26.91		-	-	-	35.88	17.94	26.91	-
C. caepitosa	-	-	-	-	-	-	-	-	17.94	-	-	-
C. helvetica Kuetzing	-	8.97	53.82	-	-	26.91	-	-	-	-	-	-
C. lanceolata	-	-	-	-	8.97	-	-	-	-	-	-	-
C. obtusiuscula (Kutz.)Grun	-	-	-	-	-	-	-	-	-	17.94	-	-
*C. parva (*W.Smith) Kitchn	8.97	-	-	-	17.94	-	-	-	26.91	-	-	-
C .tumida(Bréb.)V. Heurck	-	8.97	-	17.94	-	-	-	8.97	-	-	-	-
C .tumidula Grun	-	17.94	-	-	-	-	-	-	-	-	17.94	-
*C .turgida(*Greg.)Cleve	-	-	17.94	-	-		26.91	-	-	-	-	-
Diatoma elongtoma Agardh	-	-	-	98.67	-	-	-	17.94	-	-	26.91	-
D .vulgare Bory	8.97	-	-	17.94	-	8.97	-	17.94	8.97	17.94	-	17.94
Diploneis ovalis (Hilse)	-	-	-	-	8.97	-	-	-	-	-	-	-

Cleve.												
Fragilaria brevistriata Grunow	-	-	-	-	8.97	-	-	17.94	-	-	-	-
F. capucina Desmazieres	-	-	-	8.97	-	-	-	-	17.94	-	-	-
F. construens Grunow	-	-	-	-	-	8.97	-	-	-	-	-	-
F. crotonensis Kiton.	-	-	-	26.91	-	-	-	-	-	-	-	35.44
F. intermedia Grunow	-	-	-	-	-	-	-	-	-	-	-	17.94
Gomphonema angustatum (Ktz)		17.94	17.94	-	17.94	8.97	8.97	26.91	-	98.76	116.61	
G. gracile Ehrenberg.		17.94	35.88	-	8.97	26.91	-	-	-	44.85	53.82	17.94
G. parvulum (Kuetzing) Grunow.		17.94	35.88	26.91	-	-	-	-	8.97	17.94	44.85	17.94
Gyrosigma acuminatum(Ktz.) Rabenhorst	-	-	26.91	17.94	-	17.94	-	-		8.97	17.94	
G .attenuatum(Ktz.) Rabenhorst	-	-	-	-	-	8.97	-	8.97	-	-	-	-
G.spenceri var. nodifera Grunow.	8.97	-	-	-	-	-	-	-	-	-	-	-
Mastogloia Smithii	-	-	26.91	-	-	-	-	-	-	-	-	-
Navicula angilica Ralfs	-	-	-	-	8.97	-	-	-	-	-	-	-
N. angilica var. subsulsa	-	-	-	-	-	-	-	-	17.94	-	-	-
N. cincta (Ehr.)Kuetzing	17.94	-	62.79	80.73	35.88		26.91	-	8.97	-	-	17.94
N. creptocephala Kuetzing	-	-	-	-	-	-	8.97	17.94	-	35.88	-	-
N. dicephala W.Smith	-	-	-	-	-	26.91	-	-	71.76	62.79	-	-
N. fusca Greg	-	-	8.97	-	-	-	-	8.97	-	-	-	-
N. gibbula Cleve	-	-	-	-	8.97	-	-	-	17.94	-	-	-
N. graciloides A.Mayer	-	-	44.85	-	-	-	-	26.91	-	17.94	8.97	-
N. gregaria Donkin	-	-	17.94	8.97	-	-	-	-	35.88	-	-	
N.halophila (Grun.) Cleve.	-	8.97	-	-	-	26.91		-	-	-	-	-
N.radiosa var. tenella Grunow.	-	-	35.88	71.76	-	17.94	-		17.94	62.79	53.82	-
N. schroeteri Meister	-	-	-	8.97	-	-	-	-	-	-	-	-
*Neidium affine (*Ehr.) Pfitz.	-	-	-	-	8.97	-	-	-	-	-	-	-
Nitzschia acicularis. W. smith .	-	-	-	17.94	-	8.97	-	-	26.91	-	-	-
N.apiculata (Greg.) Grunow	-	8.97	-	26.91	71.76	-	-	-	-	-	-	-
N .closterium (Ehr.) W. Smith	-	-	-	26.91	53.82	-	-	-	35.88	-	-	-
N. cluasii Hantzsch	-	-	8.97		-	17.94	8.97	-	44.85	-	-	17.94
N. dissipata. (Kutz) Grun .	-		-	44.85	-	26.91	-	17.94	-	-	-	-
N. filiformis. (W. smith) . Hustedt .	-	8.97	-	17.94	26.91	-	-	-	-	44.85	-	-
N. fruticosa Hustedt .	-	-	98.67	26.91	17.94	-	-	44.85	-	-	-	-
N. gracilis Hantzsch	-	-	-	-	-	8.97	-	-	-	-	8.97	-
N. granulata Grunow	-	-	-	-	107.64	-	8.97	-	-	-	-	8.97
N. intermedia Hustedt	-	-	116.61	-	-	35.88	-	-	-	-	-	-
N. longissima (Breb.) Ralfs		17.94	-	-	-	-	-	26.91	-	-	17.94	-
N. obtusa W. Smith	-	-	-	-	-	-	-	-	8.97	-	-	-
N. palea (Ktz) W. Smith	-		107.64	188.37			44.85			44.85	-	-
N. puctata(W. Smith) Gruonw	-	-	44.85	62.79	-	-	17.94	-	-	-	-	-

N. sigma.(Kutz) W. smith .	-	-	-	-	-	17.94	-	-	-	8.97	-	-
N. sigmoidea. (Ehr.) W. smith .	-	17.94	215.28	71.76	-		8.97	-	-	17.94	-	-
N. tryblionella Hantzsch			17.94	26.91	8.97	-	-	-	-	80.73	62.79	8.97
Pinnularia borealis Ehr.	-		-	-	-	-	-	8.97	-	-	-	-
Rhoicosphenia curvata (Ktz.)	-		-	-	-	-	-	-	17.94	-	8.97	-
Surirella angusta Kuetzing	-		-	-	-	17.94	-	-	-	-	-	-
Synedra acus Kuetzing	-		17.94	-	35.88		-	17.94	8.97	-	26.91	-
S.tabulate.Var.fasciculate	-		-	44.85	-	-	26.91	-	-	-	-	-
S. ulna. (Nitzsche.) Ehr.	-		-	-	-	-	-	44.85	17.94	-	-	-
S.vaucheria Kuetzing	-		-	-	-	-	8.97	-	-	26.91	-	-
Total	**278.34**	**324.11**	**1721.4**	**1854.5**	**792.73**	**761.78**	**570.5**	**709.31**	**1312**	**1444.8**	**1276.2**	**310.7**

Fourth station

CYANOPHYTA	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**July**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**
Anabaena affinias Lemmermann.	-	-	-	12.987	-	-	-	-	-	-	-	-
A. flos- aquae (Lyng.)Debrebisson	-	-	12.987	-	-	12.987	-	-	-	-	-	-
Aphanocapsa littorals Hansgirg	-	-	-	-	-	-	12.98	-	-	-	12.987	-
Chroococcus dispersus Lemmermann	-	-	-	-	-	-	-	-	-	12.987	-	-
Chroococcus var. minor GM.Smith	-	-	-	12.987	36.961	-	-	-	12.98	-	-	-
Chroococcus pallidus Naegeli	-	-	-	-	-	12.987	12.98	-	-	-	-	12.987
C. minutes (Ktz.)Naegeli	12.987	-	-	-	-	-	-	-	-	-	-	-
C. turgidus (Ktz.)Naegeli	12.987	-	-	-	-	-	-	12.987	-	-	-	-
Lyngbya aestuarii Lemmermann		-	51.948	-	90.909	77.922	64.93		38.96	12.987	103.89	
Lyngbya limnetica Lemmer	-	38.961	-	-	-	-	-	-	-	-	-	-
L.mesotrica Skuja	-	-	-	-	-	-	25.97	-	-	-	-	-
Merismopedia elegans A.Braun	-	-	-	-	-	-	-	12.987	-	-	-	-
M.minima Heck	-	-	-	-	-	12.987	-	-	-	-	-	-
Microcystis aeruginosa Kuetzing	-	-	12.987	25.974	12.987	38.961	12.98	12.987	12.98	-	-	-
Nostok Sp.	-	-	-	-	-	-	-	-	12.98	-	-	-
O. articulata Gardner	-	12.987	-	-	-	-	12.98	25.974	-	-	-	-
O. curviceps Agardh	-	-	-	-	-	-	38.96	-	-	-	-	-
O. limnetica Lemmermann	-	12.987	-	-	-	-	-	-	-	-	-	-
O.limosa Roth Agardh	25.948	-	38.961	25.974	103.09	51.948	35.88	77.922	-	-	116.08	77.922
O.princeps Agardh	-	-	-	-	-	-	-	-	-	-	-	12.987
O.subbervis Schmidle	-	38.961	-	-	-	-	-	-	-	-	-	-
O. tenuis Agardh	12.987	-	-	-	-	-	25.97	-	-	-	-	-
O. angusitssimum	-	-	-	-	-	-	12.98	-	-	-	-	12.987
O. sp	-	-	-	-	-	-	-	12.987	-	-	-	-
Phormidium Fragile (Menegh.)	-	-	-	-	38.961	-	-	-	-	-	-	25.974
P. tenue (Menegh)Gom.	51.948	-	25.974	25.974	25.974	103.09	38.96	-	-	25.974	-	25.974
S.major Ktz.	12.987	-	-	-	-	-	-	-	12.98	-	12.987	12.987
CLOROPHYTA												

Actinastrum hantzschii Lagerhein	-	-	-	**51.948**	-	-	-	-	-	**12.987**	**25.974**	**12.987**
A.falcatus(Corda) Ralfs	-	-	-	-	**25.974**	-	**38.96**	-	-	-	**38.961**	
Chlamydomonas epiphytic G.M Smith	-	**12.987**	-	-	**12.987**	-	-	-	**12.98**	-	-	-
Chlorella vulgaris Bejerinck	-	-	**12.987**	-	-	-	-	-	-	-	-	**12.987**
Cladophora fracta (Dillw)Kuetzing	-	-	-	-	**12.987**	**25.974**	-	-	**25.97**	-	-	-
Cladophora glomerata Kuetzing	-	-	-	-	-	**12.987**	-	-		-	-	-
Cosmarium botrytis Meneghinii	**12.987**	-	-	-	-	-	-	-	-	-	-	**44.85**
Crucigenia fenestrate Schmidll	-	-	-	-	-	-	**12.98**	**25.974**	-	-	-	-
Crucigenia apiealata	-	**12.987**	-	**12.987**	-	-	-	-	-	-	**12.987**	-
Gonium pectoral Mueller	-	-	**38.961**	-	-	-	-	-	-	**12.987**	-	-
Microspora loefgrenii Lagerheim	-	-	-	-	**38.961**	-	-	-	-	-	-	**12.987**
Mougeotia Sp.	-	**25.974**	-	-	-	-	-	-	-	-	-	-
Pediastrum integram Naegli.	-	-	-	**25.974**	-	-	-	-	-	**12.987**	-	-
P .boryanum (Turp.)Meneghini	-	-	-	-	-	-	-	**12.987**	-	-	-	**12.987**
P .duplex Meyen	**25.974**	-	-	-	-	-	-	**12.987**	-	-	**12.987**	-
P .simplex Meyen	-	-	-	-	-	-	**25.97**		-	-	**38.961**	-
Odegonium gracillius (Wittr.)Tiffany	-	-	-	-	**12.987**	-	-	-	-	-	-	**12.987**
Scenedesmus aboundans (Kirch)Chodat	-	-	-	-	-	**12.987**	-	-	-	**64.935**	-	-
Scenedesmus acuminatus (Lag.) Chodat	-	**12.987**	**38.961**	-	-	-	-	-	-	-	-	-
S .brasiliensis Bohlin	**12.987**	-	-	**25.974**	-	**12.987**	**38.96**	-	**38.96**	-	**12.987**	-
S.bijuga(Turb.)Lagher	**25.974**	-	-	-	-	-	-	**25.974**	-	-	-	**12.987**
S .longus Meyen	-	-	-	-	**25.974**	-	**12.98**	-	**12.98**	-	**25.974**	-
S .quadricauda (Turb.)de Brebisson	-	-	-	-	-	**25.974**	-	**12.987**	-	-	-	-
S.quadricauda var longispina(Chodat)G.M. Smith	-	-	**38.961**	-	-	-	**12.98**	-	-	-	-	-
S .quadricauda var maximus West and West	-	-	-	-	-	-	**25.97**	-	-	-	-	-
S .quadricauda var westii	-	-	-	-	**25.974**	-	-	-	-	-	-	-
Spirogyra fluviatilis Hilae	-	**12.987**	**90.909**	-	**51.948**	-	**17.94**	-	**77.92**	-	**12.987**	**25.974**
S .proticalis (Muell.)Petit.	**12.987**	-	**51.974**	-	-	**38.961**	-	**12.987**	-	**25.974**	-	-
Stigeoclonium attenutum Collins	-	-	-	-	**12.987**	-	**12.98**	-	**12.98**	-	-	-
Tetradron caudautm Hansgirg	-	**25.974**	-	-	-	-	-	-	-	-	-	-
Tetradron trigonum Hansgirg	-	-	-	-	-	-	-	-	-	**38.961**	-	-
Euglenophyta												
Euglena minuta		**25.974**	-	**12.987**	-	-	**12.98**	-	-	-	-	-
E. gracilis Klebs.											12.987	
E. polymorpha Dangread						**12.987**						

Phacus orbicularis Huneber	-	-	-	-	-	-	-	-	-	12.987	-	12.987
Pyrophyta												
Peridinium cinictum	-	-	-	-	-	-	-	12.987	-	-	-	-
Bacillariophycea												
Centrales												
Aulacoseira ambigua O. Muller	26.91	35.88	98.67	-		-	71.76	80.73	26.91		53.82	44.85
Aulacosiera ambigua . O.Muller	-	-	8.97	-	98.67	-	-	17.94		-	-	-
A. distans (Ehr.) Kuetzing	-	-	-	-	-	-	17.94	-	-	-	-	-
A. granulata (Ehr.) Ralfs		-		98.67	35.88		-			161.64	53.82	
A .italic(Ehr.) Ralfs	-	-	-	-	-	-	-		-	-	-	-
Cyclotella comta (Fhr.) Kutz	8.97	-	152.49	-	89.7	-	44.85	17.94	-	-	-	-
C .meneghiniana Kuetzing	-	-	-	26.91		-	-	-	-	107.64	-	35.88
C. ocellata pantocsek	-	35.88	-	-	-	-	-	-	53.82	-	107.64	
Melosira ambigua O.Muller		26.91	71.76	53.82	17.94		17.94		-	44.85	-	-
Melosira granulate (Ehr.)Ralfs	26.91	-	53.82	17.94	-	-		35.88	-	-	-	-
Melosira distance (Ehr.) Kuetzing.	-	-	-	17.94	-	8.97	-	-	26.91	-	17.94	-
Stephanodiscus astrea (Ehr.) Gran.	-	-	-	-	-	-	-	-	-	-	-	44.85
Pennales												
Achnanthidium affine (Grunow) Czarnecki		35.88	8.97	26.91	-	44.85	-		-	-	8.97	-
A. conspicua A. Mayer	-	-	-	-	53.82	-	-	-	-	-	17.94	8.97
A.mintussima Kuetzing		-	-	-	26.91	-	-	35.88	8.97	-	-	-
Amphiprora coffeaeformis (Agardh)	-	53.82	8.97	-	-	-	-	26.91	-	26.91	-	17.94
A. ovalis Kuetzing	17.94	-	-	-	-	-	-	-	-	-	-	-
Asterionella Formosa Hass.	-	8.97	-	-	-	17.94	-	26.91	-	-	-	8.97
Bacillaria paxillifer (Muell.) Hendey.		26.91	-	80.73	71.76	-	-	-	35.88	-	-	-
Cocconeis pediculus Ehrenberg	-	17.94	53.82	-	-	35.88	8.97	-	-	-	26.91	
C. placentula Ehrenberg	17.94	-	-	-	-	-	62.79	-	-	8.97	-	53.82
*C. placentula var. euglypta(*Ehr.)	-	8.97	-	53.82		17.94	-	17.94		35.88	44.85	
C. placentula var . lineate (Ehr.)			71.76	-	53.82	-	26.91		17.94	35.88	80.73	
Cymatopleura elliptica (Breb.) W.Smith.	8.97	-	44.85	35.88	62.79	-	-	17.94	-	-	17.94	53.82
C.solea (Berb.) W.Smith.		17.94	-	-	17.94	-	8.97	-	-	-	-	-
Cymbella affinis Kuetzing.			8.97	-	-	17.94	-	-	26.91	71.76	89.7	
C. caepitosa	-	-	-	17.94	-	-	-	-	-	-	26.91	-
C. gracilis(Rabh .)Cleve	-	-	26.91	44.85	-	-	17.94	-	26.91	-	-	-
C .tumidula Grun	-	-	53.82	71.76	26.91	62.79	-	35.88	17.94	-	-	8.97
C .ventricosa(Greg) Cleve	-	17.94	-	-	-	-	-	-	-	-	-	-
Diatoma elongtoma (Lyngb.) Agardh	26.91	44.85	-	35.88	-	-	8.97	-	26.91	17.94	35.88	-
D .vulgare Bory	-	-	-	-	-	-	-	17.94	-	-	-	8.97
Diploneis ovalis (Hilse) Cleve.	-	-	-	-	-	-	-	-	-	-	8.97	-
Fragilaria brevistriata Grunow	-	-	53.82	-	71.76	-	-	-	62.79	44.85	80.73	-
F. crotonensis Kiton.	-	-	71.76	-	-	-	-	53.82	-	72.97	-	17.94
F. intermedia Grunow		44.85	-	8.97	-	17.94	62.79	-	71.7	-	-	-

									6			
Gomphonema acuminatum Her.	-	-	-	-	-	-	-	-	-	26.91	-	-
G. angustatum (Ktz)Rabe.	-	44.85	35.88	-	26.91	44.85	-	-	44.85	35.88	53.82	26.91
G. gracile Ehrenberg.	17.94	-	-	-	-	-	-	-	-	26.91	8.97	-
G. parvulum (Kuetzing) Grunow.	-	-	-	17.94	-	-	26.91	-	-	-	-	-
Gyrosigma acuminatum(Ktz.) Rabenhorst	-	-	-	17.94	-	35.88	-	-	80.73	-	-	-
G .attenuatum(Ktz.) Rabenhorst	-	-	-	-	-	-	-	-	17.94	-	17.94	-
N. lanceolata (Ag.) Kuetzing.	80.73	-	-	-	-	-	-	-	-	-	-	-
N. cincta (Ehr.)Kuetzing	-	98.67	80.73	188.37	-	98.67	-	-	-	98.67	17.94	-
N. creptocephala Kuetzing	-	-	-	-	-	-	26.91	-	-	-	-	-
N. decussis Oestrup	-	-	-	-	-	-	-	-	98.67	-	-	-
N. gracilis	-	-	-	89.7	-	-	44.85	-	-	-	-	-
N. gregaria Donkin	-	-	44.85	-	53.82	-	-	-	-	-	17.94	-
N.halophila (Grun.) Cleve.						44.85		53.82		17.94		
N.radiosa var. tenella (Breb.) Grunow.		53.82	107.64	-	53.82	17.94	17.94	26.91	26.91	-	17.94	44.85
Neidium affine (Ehr.) Pfitz.	-	-	-	-	-	-	8.97	-	17.94	17.94	-	-
N.apiculata (Greg.) Grunow	-	-	-	-	17.94	-	-	-	-	-	-	-
N. cluasii Hantzsch	-	-	-	25.88	35.88	17.94	-	26.91	17.94	62.79	26.79	-
N. dissipata. (Kutz) Grun .		107.64	-	134.55	44.85	-				152.49	17.94	
N. filiformis. (W. smith) Hustedt	26.91	44.85	26.91	-	-	-	17.94		17.94	-	-	-
N. fruticosa Hustedt	-	-	-	-	-	-	-	-	-	-	26.91	-
N. gracilis Hantzsch	-	-	-	35.88	-	-	-	-	53.82	-	-	-
N. granulata Grunow	8.97	-	-	-	17.94	26.91	-	-	-	-	-	-
N. intermedia Hustedt	26.91	-	62.79	-	-	-	-	-		-	-	17.94
N. longissima (Breb.) Ralfs	-	-	98.67	44.85	26.91	-	26.91	-	-	-	35.88	-
N. palea (Ktz) W. Smith	-	35.88	35.88	26.91	53.82			17.94	-	53.82	-	-
N. puctata(W. Smith) Gruonw	-	-	-	-	8.97	-	-	-	17.94	-	-	-
N.pusilla Kuetzing	17.94	-	-	8.97	-	-	-	-	-	-	-	-
N. sigmoidea. (Ehr.) w. smith .	-	-	53.82	62.79	17.94	35.88	17.94	26.91	-	80.73	188.37	-
N. tryblionella Hantzsch	-	17.94	26.91	71.76	-	-	-	-	-	98.67	-	-
Pinnularia borealis Ehr.	-	-	-	62.79	-	71.76	17.94	-	80.73	-	-	-
Pleurosigma angulatum W.Smith	-	-	-	-	17.94	-	-	-	-	-	-	-
Rhoicosphenia curvata (Ktz.) Grunow.	17.94	8.97	17.94	-	-	17.94	26.91	-	26.91	-	44.85	-
Surirella. robusta Ehr.	-	-	-	17.94	17.94	-	-	35.88	8.97	-	-	-
Synedra acus Kuetzing	-	17.94	-	116.61	17.94	8.97	26.91	-	53.82	17.94	-	35.88
S. ulna. (Nitzsche.) Ehr.	35.88	-	-	-		17.94	17.94	17.94	89.7	35.88	17.94	-
	588.5	1041.	1784.	1722.	1533.	1091.	1110	864.7	1318	1576.	1593.	761.1

Fifth station

CYANOPHYTA	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**July**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**
Anabaena affinias Lemmermann.	12.987	-	-	12.987	-	38.961	-	-	142.8	-	-	12.987
A. flos- aquae	-	-	-		-		12.98	12.987	-	-	-	-

(Lyng.)Debrebisson												
Aphanocapsa littorals Hansgirg	-	-	-	25.974	-	51.948	-	-	12.98	-	-	-
Calothrix Sp.			12.987									
Chroococcus dispersus (Keissl)Lemmermann	-	12.987	-	51.948	-	-	-	-	-	25.974	-	-
*Chroococcus var. minor.*Smith	12.987	-	-	116.88	-		12.98	12.987	12.98	324.67	-	-
C. turgidus (Ktz.)Naegeli	-	-	-	-	12.987	-	-	-	-	-	25.974	-
Lyngbya limnetica Lemmer	-	12.987	77.922	-	25.974	-	-	-	-	-	-	12.987
L.major Meneghini				12.987					25.97			
L.mesotrica Skuja	-	-	-	90.909	-	-	-	-		-	-	-
Lyngbya sp.						12.987						
Merismopedia elegans A.Braun	-	12.987	-	77.922	12.987	-	-	-	-	-	12.987	-
M.minima Heck	-	-	-	-	-	-	25.97	25.974	116.8	-	-	-
M. punctata Heyen		25.987					12.98	12.987				
Microcystis aeruginosa Kuetzing	-	-	12.987		64.935	25.974	25.97	25.974	12.98	25.974	-	12.987
M. robusta (Clark)Nygaard			25.974									
Nostoc Sp.	-	12.987	-	-	-	-	-	-	-	-	-	-
O. amoena (Ktz.) Gomont				12.987								
O.,chalybea Mertens										25.974		
O. limnetica Lemmermann	12.987	-	-	-	25.974	-	-	-	103.8	-	25.974	-
O.limosa Roth Agardh		-	-	181.8	-	142.85	-	-	38.96	116.88	-	12.987
O.princeps Agardh	-	-	-	-	-	38.961	12.98	12.987	-	12.987	-	-
O.subbervis Schmidle		12.987										
O. tenuis Agardh	-	-	-	-	-	142.85	12.98	12.987	-	-	12.987	-
O. anguina	-	25.974	-	-	-	-	-	-	-	-	-	-
O. angusitssimum	-	-	-	-	-	12.987	-	-	38.96	-	-	12.987
O. splanidida	-	-	-	-	-	25.974	-	-	-	-	12.987	-
Phormidium Fragile (Menegh.)Gomont.	12.987	-	-	12.987	25.974	-	12.98	12.987	-	-	-	1.987
P. tenue (Menegh)Gom.	-	-	-	-	-	-	25.97	25.974	-	-	-	-
Phormidium Sp.	-	38.961	-	-	-	-	-	-	-	-	-	-
Spirulina Laxa G.M.Smith	-	-	-	12.987	-	-	-	-	-	-	25.987	-
S.major Ktz.	-	-	38.961	-	-	-	-	-	51.94	-	-	-
CLOROPHYTA												
Actinastrum gracilimum G.M.Smith	-	-	-	12.987	-	-	-	-	-	-	-	-
Actinastrum hantzschii Lagerhein	-	12.987	-	38.961	38.961	64.935	-	-	-	12.987	-	-
A.falcatus (Corda) Ralfs	-	-	38.961	-	12.987	-	12.98	12.987	-	-	-	-
Chlorella vulgaris Bejerinck	12.987	-	-	-	-	-	12.98	12.987	-	-	-	-
Cladophora fracta	-	-	-	-	-	25.97	-	-	38.9	-	12.98	-

(Dillw)Kuetzing						**4**			**6**		**7**	
Closterium parvalum Naegeli	-	-	-	-	-	-	-	-	**12.98**	**25.974**	-	-
C.depresum Lundell	-	**12.987**	-	-	-	-	-	-	**25.97**	-	-	-
Crucigenia fenestrate Schmidll	-	-	-	-	-	**12.987**	-	-	-	-	**12.987**	-
Microspora loefgrenii Lagerheim	**25.974**	-	**12.987**	-	-	-	-	-	-	-	-	**25.974**
Pediastrum integram Naegli.	-	-	-	**12.987**	-	-	-	-	-	**12.987**	-	-
P. boryanum (Turp.)Meneghini	-	-	-	-	-	-	-	-	**12.98**	-	-	-
P.sculptatum G.M.Smith		-	-	-	-	-	-	-	-	**38.961**	-	-
P. simplex Meyen	-	-	**12.987**	-	-	-	-	-	-	-	-	-
Odegonium gracillius (Wittr.)Tiffany	-	**12.987**	-	-	-	-	-	-	-	-	-	-
Oocystis borgei Snow.	-	-	-	-	-	-	-	-	**12.98**	-	-	-
Scenedesmus aboundans (Kirch)Chodat	-	**25.974**	**38.961**	**25.974**	-	-	-	-	-	**77.922**	-	-
Scenedesmus acuminatus (Lag.) Chodat	-	-	**77.922**	-	**51.948**	-	**38.96**	**38.961**	**25.97**	-	-	-
S. brasiliensis Bohlin	-	**12.987**	**90.909**	-	-	-	-	-	**25.97**	-	**12.987**	-
S.dimorphus (Turb.)Ktz.	-	**25.974**	-	-	-	-	-	-	-	-	-	-
S. obligus (Turb.)		-	-	-	-	-	-	-	-	-	-	-
S. quadricauda (Turb.)de Brebisson	-	-	-	-	**12.987**	-	-	-	-	-	**25.974**	-
S.quadricauda var longispina(Chodat)G.M. Smith	-	-	-	-	-	-	**25.97**	**25.974**	-	**12.987**	-	-
S. quadricauda var maximus West and West	-	-	**12.987**	-	-	-	-	-	-	-	-	-
S. quadricauda var westii	-	-	-	**38.961**	-	-	-	-	-	-	-	-
Selanastrum gracile (Reinsch)Korsch	-	-	-	-	-	**12.987**	-	-	**25.97**	-	**12.987**	**77.922**
Selanastrum sp.	-	-	-	-		-	-	-	-	-	-	-
Spirogyra fluviatilis Hilae		-	-	-	**25.974**	-	-	-	-	-	-	-
Stigeoclonium attenutum Collins	-	-	-	**25.974**	**12.987**	-	**12.98**	**12.987**	-	-	-	-
Tetradron caudautm Hansgirg	**12.974**	-	-	**12.987**	-	**38.961**	-	-	-	**38.961**	-	-
Tetradron trigonum Hansgirg	-	-	**12.987**	-	-		**12.98**	**12.987**	-	-	**12.987**	-
Ulothrix subtilissima Rabenhorst	-	**12.987**	**12.987**	-	-	-	-	-	-	-	-	-
Euglenophyta												
Euglena polymorpha Dangeard									**12.98**			
Phacus orbicularis Huebner				12.987								
Bacillariophycea												
Centrales												
Aulacoseira distans (Ehr.) Kuetzing	-	-	-	**17.94**	-	-	-	-	-	-	-	-
A. italica (Ehr.) Ralfs	-	-	-	-	-	**26.91**	**17.94**	**17.94**	-	-	-	-
Cyclotella comta (Ehr.) Kutz		-	**17.94**	**8.97**	-	**17.94**	-	-	**17.94**	-	-	-
C. meneghiniana Kuetzing	-	-	**44.85**	-	**134.55**	**35.88**	**107.6**	**107.64**	**26.91**	**17.94**	**62.79**	**17.94**
C. ocellata pantocsek	-	**71.76**	-	**17.94**	**35.88**	-	-	-	-	-	-	-
Melosira ambigua O.Muller	**17.94**	-	-	**35.88**	-	-	-	-	-	-	**26.91**	-

Melosira granulate (Ehr.)Ralfs	-	17.94	-	-	-	-	-	-	8.97	-	-	-
Melosira distance (Ehr.) Kuetzing.	-	-	26.94	-	-	-	17.94	17.94	-	-	-	-
Stephanodiscus astrea (Ehr.) Gran.	-	-	-	-	-	-	-	-	-	-	-	-
Stephanodiscus hantzschii Grunow	-	26.91	107.64	35.88	35.88	-	-	-	-	-	17.94	-
Pennales												
Achnanthidium affine (Grunow)	-	-	8.97	17.94	17.94	35.88	17.94	17.94	26.91	-	44.85	17.94
A. conspicua A. Mayer	-	-	-	-	-	-	-	-	-	35.88	-	-
A. delicatula (Ktz.) Grunow	-	17.94	-	-	-	-	-	-	-	-	-	-
A. Microcephala (Kuetzing)Grunow	-	-	-	26.91	-	-	-	-	-	17.94	26.91	17.94
A.mintussima Kuetzing	17.94	-	71.76	53.82	-	-	-	-		-	17.94	17.94
Amphiprora alata . Kutz	-	-	-	-	-	17.94	-	-	-	-	-	-
Amphiprora coffeaeformis (Agardh)	8.97	-	-	17.94	-	-	-	-	-	-	26.91	17.94
Amphora normanii Rabh	-	8.97	26.91	17.94	17.94	35.88	-	-	17.94	44.85	17.94	8.97
A. ovalis Kuetzing		-	-	-	-	-	17.94	17.94	-	-	-	-
A. veneta Kuetzing.	-	-	17.94	-	-	-	-	-	-	-	-	-
Bacillaria paxillifer (Muell.) Hendey.	-		-	-	8.97	26.91	-	-	17.94	-	-	44.85
Caloneis ventricosa (Ehr.) Meister.	-	-	-	-	-	17.94	-	-	-	-	-	-
Cocconeis pediculus Ehrenberg		-	-	-	-	-	-	-	17.94	35.88		
C. placentula Ehrenberg	44.85	-	-	71.76	26.91	-	8.97	8.97		26.91	80.73	
C. placentula var. euglypta(Ehr.)		26.91	-	35.88	-	-			17.94	71.76		
C. placentula var . lineate (Ehr.)	8.97	-	44.85	-	-	35.88	17.94	17.94	89.7	80.73	98.67	
Cymatopleura elliptica W.Smith.	-	-	44.85	-	-	-	-	-	-	-	-	-
C.solea (Berb.) W.Smith.	-	-	-	-	26.91	26.91	35.88	35.88	44.85	-	17.94	-
Cymbella affinis Kuetzing.	-	-	26.91	-	17.94	-	-	-	-	17.94	71.76	80.73
C. caepitosa	-	-	-	8.97	-	-	-	-	-	-	-	-
C. cistula(Ehr..) Kirchn	-	-	-	-	-	-	17.94	17.94	-	-	-	-
C. gracilis(Rabh .)Cleve	-	26.91	-	-	-	35.88	-	-	-	-	-	-
C. helvetica Kuetzing	-	-	-	26.91	-	-	-	-	-	-	-	-
C. lanceolata	-	-	-	-	-	-	-	-	-	-	-	-
C. obtusiuscula (Kutz.)Grun	-	-	-	-	-	-	-	-	17.94	-	-	-
C .parva (W.Smith) Kitchn	-	-	-	-	-	-	17.94	17.94	-	-	-	-
C. tumida(Bréb.)V. Heurck	-	-	35.88	-	-	-	-	-	-	-	-	8.97
C. tumidula Grun	17.94	-	-	-	26.91	-	-	-	-	-	-	-
C. turgida (Greg.)Cleve	-	17.94	-	-	-	-	-	-	-	8.97	-	-
Diatoma elongtoma Agardh	-	-	-	17.94	8.97	35.88	26.91	26.91	-	-	-	-
Fragilaria brevistriata Grunow	-	-	26.91	-	-	-	17.94	17.94	-	35.88	-	
F. capucina Desmazieres	-	26.91	-	35.88	98.67	26.91	35.88	35.88	-	53.62	-	17.94
F. construens Grunow	-	-	17.94	-	44.85	-	-	-	-	-	-	-
F. crotonensis Kiton.	-	-	-	26.91	-	-	-	-	-	-	-	-
F. intermedia Grunow	-	35.88	-	-	-	17.94	-	-	35.88	-	-	-
Gomphonema acuminatum Her.	-	-	17.94	-	-	-	-	-	-	-	-	-
G. angustatum (Ktz)Rabe.		17.94	8.97	53.62	44.85	-	17.94	17.94	71.76	170.43	143.52	
G. intricatum Kuetzing	-	-	17.94	26.91	-	-	-	-	-	-	-	-

G. intricatum var. lunata nov.	-	-	-	26.91	-	26.91	-	-	-	17.94	35.88	-
G . sphaerophorm	-	-	-	-	17.94	-	-	-	8.97	-	-	-
Gyrosigma acuminatum(Ktz.)	17.94		17.94	-	8.97	26.91	35.88	35.88	17.94	8.97	26.91	35.88
G. attenuatum(Ktz.) Rabenhorst	-	17.94	8.97	17.94	17.94	35.88	26.91	26.91	-	35.88	17.94	8.97
G. peisonis Hustedt	17.94	-	-	-	-	-	-	-	-	-	-	-
Mastogloia smithii	-	-	-	-	-	-	-	-	8.97	-	-	-
Navicula angilica Ralfs	-	-	-	-	-	17.94	-	-	-	8.97	-	-
*N. lanceolata (*Ag.) Kuetzing.	44.85	-	17.94		-		-	-			-	-
*N. cincta (*Ehr.)Kuetzing	17.94	8.97	116.61	134.55	17.94	44.85	-	-	62.79	26.91	-	-
N. creptocephala Kuetzing							17.94	17.94	62.79		-	-
N. decussis Oestrup	-	-	98.67	-	-	-			-	-	-	-
N. graciloides A.Mayer	-	-	-	-	-	-	-	-	-	-	44.85	-
N. gregaria Donkin	-	-	-	-	-	-	-	-	-	17.94	-	-
N.halophila (Grun.) Cleve.	17.94	-	-	26.91	26.91	-	-	-	35.88	-	44.85	17.94
N.radiosa var. tenella Grunow.	-	-	152.94	53.82	-	134.55	-	-	-	179.4	-	35.88
N. schroeteri Meister	-	-	8.97	-	-	-	-	-	17.94	-	-	-
Nitzschia acicularis. W. smith .	8.97	-	-	-	17.94	17.94	-	-	-	53.82	26.91	-
N.apiculata (Greg.) Grunow	-	-	-	17.94	-	-	-	-	-	-	-	-
N. cluasii Hantzsch	-	17.94	53.82	-	4.85	35.88	-	-	-	-	-	-
N. dissipata. (Kutz) Grun .	17.94	26.91	-	62.79	-		17.94	17.94		8.97	80.73	17.94
N. fruticosa Hustedt.	-	-	-	-	17.94		-	-	-	-	17.94	-
N. gracilis Hantzsch	-	-					71.76	71.76	35.88		-	
N. hungarica Grunow		62.79	-	-	-	-	-	-	-	-	44.85	35.88
N. intermedia Hustedt	-	-	-	-	17.94	-	35.88	35.88	-	-	-	-
N. linearis W. Smith	-	-	-	-	-	17.94	-	-	-	17.94	-	-
N. longissima (Breb.) Ralfs	-	-	-	-	17.94	-	-	-	-	-	-	-
N. palea (Ktz) W. Smith	17.94	80.73	35.88	44.85	98.67	17.94			26.91	-	-	35.88
N.pusilla Kuetzing	-	-	-	35.88	-	-	-	-	-	53.82	71.76	-
N. sigmoidea. (Ehr.) W. smith .	-	-	-	-	17.94	35.88	-	-	26.91	17.94	17.94	-
N. tryblionella Hantzsch	-	-	-	12.987	-	17.94	26.91	26.91	-	62.79	-	-
N. vermicularis (ktz) Hantzsch	-	-	-	103.89	-	-	-	-	-	-	-	-
Pinnularia borealis Ehr.	8.97	-	-	25.974	-	-	-	-	-	-	-	-
Pleurosigma angulatum W.Smith	-	-	12.987		-	-	-	-	-	-	8.97	-
Rhoicosphenia curvata (Ktz.)	-	-	-	51.948	-	-	-	-	44.85	-	-	-
Surirella. robusta Ehr.	-	17.94	-	116.88	17.94	17.94	35.88	35.88	26.91	17.94	-	8.97
Synedra acus Kuetzing	-	17.94	-	-	26.91		35.88	35.88		62.79	-	
S.tabulate.Var.fasciculate	17.94	-	77.922	-	-	-	17.94	17.94	-	-	-	-
S. ulna. (Nitzsche.) Ehr.	-	26.91		12.987	26.91	17.94	-	-	35.88	17.94	26.91	8.97
S.vaucheria Kuetzing	-	-	-	90.909	-	-	-	-	-	-	-	-
Total	408.8	846.8	1648.	2185.	1226.	1510.	972.	972.3	1578	1981.	1329.	628.2

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