

Available online at http://www.journalcra.com

International Journal of Current Research Vol. 15, Issue, 01, pp.23211-23216, January, 2023 DOI: https://doi.org/10.24941/ijcr.44537.01.2023 INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

PHYTOPLANKTONIC DIVERSITY OF SOME RICE-GROWING DAMS IN YAMOUSSOUKRO (CÔTE D'IVOIRE)

N'DA Amalan Sylvie ¹*, LOZO Roméo N'Guessan¹, KONE Naminata², ODOUKPE Kadio Saint Guillaume¹ and BERTE Siaka¹

¹ Biosciences Training and Research, Félix Houphouët-Boigny University (UFHB), 22 BP-582, Abidjan-22, Côte d'Ivoire; ² Science and Technology Department, Superior Normal School (ENS), Abidjan, 08 BP-10, Abidjan- 08, Côte d'Ivoire

ARTICLE INFO	ABSTRACT				
<i>Article History:</i> Received 16 th October, 2022 Received in revised form 19 th November, 2022 Accepted 15 th December, 2022 Published online 20 th January, 2023	Many small dams for agropastoral purposes have been initiated in various regions of the country, with the aim of promoting economic and social development, particularly to facilitate rice yields. These aquatic environments are home to an important biodiversity, including phytoplankton, which are not well known and likely to be impacted by human activities. The objective of this work is to know the phytoplankton population of the Yamoussoukro rice-growing dams in order to prevent the risks of eutrophication. The physico-chemical parameters of the water were measured with a multi-parameter				
Key words:	HANNA model HI 98194 in three stations (Nanan, Subiakro and Zatta). Nutrient salts were measured using HANNA digital mini-photometers model H1781. Taxa were sampled with a plankton net of 20				
Phytoplankton, Diversity, Dams, Yamoussoukro, Côte d'Ivoire.	μm mesh size. A photonic microscope was used to observe the different samples collected. In total, one hundred and fourteen (114) phytoplankton taxa were inventoried and divided into for (4) phyla: Chlorophyta (44 taxa or 39%), the Euglenophyta (41 taxa or 36%), Cyanoprokaryota (16 taxa or 14%) and Heterokontophyta (13 taxa or 11%). Water reservoirs could be considered rich in taxa. Chlorophyta and Euglenophyta contain the greatest diversity and constitute more than half of all taxa collected. The study also revealed that the reservoirs are warm (29.86°C) and acidic with low				
*Corresponding Author: N'DA Amalan Sylvie	dissolved oxygen (2.25 mg/l) and high nutrient values (ammonium, nitrate, nitrite and ortho- phosphate). This mineralization of these waters explains the high diversity of taxa in the Yamoussoukro dams.				

Copyright©2023, N'DA Amalan Sylvie et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: N'DA Amalan Sylvie, LOZO Roméo N'Guessan, KONE Naminata, ODOUKPE Kadio Saint Guillaume and BERTE Siaka. 2023. "Phytoplanktonic diversity of some rice-growing dams in yamoussoukro (Côte d'Ivoire)". International Journal of Current Research, 15, (01), 23211-23216.

INTRODUCTION

Aquatic environments, in particular freshwater, are a source of environmental services and drinking water supply for human populations (Fonsceca et al., 2014). Increasingly, the question of water quality and quantity is one of the environmental issues that generates discussions between researchers and decisionmakers (Dodds et al., 2009). This is related to the health and economic consequences of water pollution, the pressures exerted on aquatic resources due to the increase in water needs (Ben Abou et al., 2014). Indeed, human activities lead to several physical and chemical changes that can modify the structure and functioning of aquatic ecosystems. According to Silva et al. (2012), small basins represent means important for identifying changes in land use, because they are more efficient in processing and transporting elements, such as carbon, nitrogen, major cations and anions (Thomas et al., 2004). In the department of Yamoussoukro, several agropastoral dams have been built, including rice dams on the

Bandama River (Brou *et al.*, 2005). These dams are home to aquatic biodiversity, including micro-algae. The objective of this work is to know the phytoplankton population of some dams of the department of Yamoussoukro.

MATERIAL AND METHODS

Study area: The study environment, with an area of 4.651 km², is located in the district of Yamoussoukro, capital of Côte d'Ivoire, between 6°15 and 7°35 north latitude and 4°40 and 5° 40 west longitude (Anader, 2006). The city has 31 lakes and other bodies of water, ten of which are artificial and were created in the 1970s (Kollia, 1998) to receive runoff water. The different dams in our study are Nanan, Subiakro and Zatta (Figure 1).

Measurement of environmental variables and Sampling: The main physico-chemical parameters were measured *in situ* using a HANNA brand portable multi-parameter model HI 98194. The levels of nutrient salts such as phosphates, nitrites, nitrates and ammonium were measured. To do this, a water sample was taken for field analysis using HANNA model H1781 mini digital photometers. The samples were taken using a plankton net with a 20 μ m mesh vacuum between October 2021 and March 2022.

The sampling consisted on the one hand of filtering five buckets of 10 liters of water using of the plankton net and on the other hand, to take water directly from the environment using a pillbox. A photonic microscope with a 40x objective made it possible to observe the various samples taken. Documents from various authors have helped to identify the different taxa.

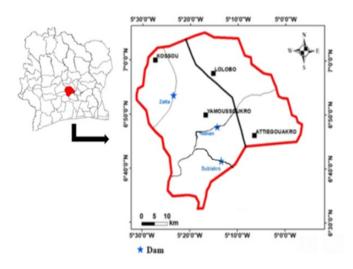


Figure 1. Map showing the collection sites

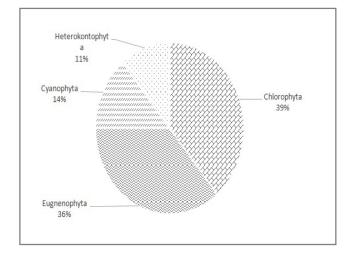


Figure 2. Proportion of different phyla

RESULTS AND DISCUSSION

Physico-chemical parameters: Table 1 presents the values of the different physicochemical parameters. The average temperature recorded in the study stations is 29.86°C. This temperature value indicates that the waters of these stations are relatively warm. According to Lemoalle (1999), the average water temperatures of aquatic environments in intertropical

Africa are high and most often above 20° C. Water temperatures between 25 and 30° C are favorable to the development of aquatic life (Lwamba *et al.*, 2015).

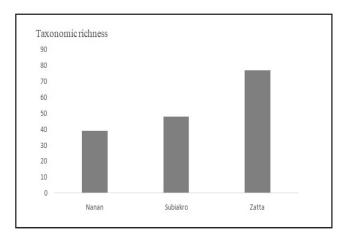


Figure 3. Taxonomic richness by station

The pH in this study is slightly alkaline and tends towards neutrality. Which would be favorable to the life of the organisms. Similar pH values were observed by (Koné et al., 2022). The dissolved oxygen values recorded in this study are low. The low oxygen rate would be due to the presence of reducing deposits resulting from inputs from anthropogenic activities. These results are similar to those of Koné et al. (2022). The average conductivity value (159.25 μ S/cm) recorded in this study is higher than those (123.2 and 133.8 μ S/cm) obtained by Sanogo *et al.* (2014) on the agricultural perimeter of Bama and Boura in Burkina Faso. These high values indicate that the waters of these sites are highly mineralized. This significant mineralization is due to the use of chemical fertilizers by rice farmers (Nouayti et al., 2015). According to N'guessan (2017), the electrical conductivity of Yamoussoukro waters generally exceeds 100 µS/cm. The average value of the nitrate rate (NO³⁻) 0.35 mg/L. Nitrate, the last stage of nitrogen oxidation, is necessary for the development of aquatic flora. The different concentrations of nutrient salts (ammonium, nitrite and ortho-phosphate) in the study stations are due to anthropogenic activities. Indeed, the occupation of the banks by market gardening, the presence of rice plots in the perimeters and the use of chemical fertilizers by farmers, is at the origin of a significant spill of nutrients in these dams.

Specific composition: Table 2 lists the taxa inventoried in the different dams studied. The algal flora of all the environments studied includes 114 taxa belonging to for (4) phyla: Chlorophyta (44 taxa or 39%), the Euglenophyta (41 taxa or 36%), Cyanoprokaryota (16 taxa or 14%) and Heterokontophyta (13 taxa or 11%). Euglenophyta and Chlorophyta contain the greatest diversity and constitute more than half of all taxa encountered. It should be noted that Euglenaceae represent the only family Euglenophyta, while Chlorophyta are represented by 9 families of which the best represented is Scenedesmaceae with 17 taxa. This dominance of Chlorophyta and Euglenophyta would be due to the richness of organic substances in the environment (Kim and Boo, 1998). The wealth would be due to the fact that the waters of the reservoir are stagnant. This would promote biological processes such as the complete cycles of reproduction and development of algae. This observation was made by Ouattara (2000) on Lake Ayamé in Côte d'Ivoire.

Table 1: Spatial variation of physico-chemical parameters

Stations	T°C	pН	CND (µS/cm)	$O_2(mg/l)$	NO_2^- (mg/L)	$NO_3^-(mg/L)$	$PO_4^{2-}(mg/L)$	NH_4^+ (mg/L)
Nanan	31.33	6.65	144.5	2,815	6.14	0.36	0.1	0.46
Subiakro	28.26	7.26	186.5	1.9	0.5	0.09	0.69	0.68
Zatta	29.98	7.03	146.75	2.02	14.81	0.49	0.46	0.37
Medium	29.86	6.98	159.25	2.25	7.15	0.31	0.42	0.50

Table 2. List of phytoplankton taxa collected at dams: x = species present

ТАХА	Nanan	Subiakro	Zatta
Cyanophyceae Sachs			
Chrooccaceae Nageli			
Aphanocapsa elachista G.S. West	х	X	х
Aphanocapsa incerta Lemmermann	X	X	
Chroococcus dispersus (Keissler) Lemmermann			x
Chroococcus limneticus Lemmermann	х		х
Merismopedia elegans Braun			Х
Merismopedia glauca (Ehrenberg) Nägeli	X		х
Merismopedia punctate (Ehrenberg) Nägeli			X
Microcystis aeruginosa (Kutzing) Kutzing	X	X	X
Microcystis wesenbergii Komarek		X	
Coelosphaeriaceae			
Coelomoron pusillum (Van Goor) Komarek		X	X
Nostocaceae Dumortier			
Anabaena mucosa Komarkov-Legnerova and Eloranta			X
Anabaena planctonica brunnthaler Anabaena spiroides Klebahn	X	v	X
Anabaena spirotaes Kiebaini Anabaena sp.		X	X
Oscillatoriaceae (Gray) Bory de St. Vincent		X	
Oscillatoria princeps Gomont		x	x
Spirulina princeps West & G.S. West		A	X
Heterokontophyta Van Den Hoek <i>et al.</i>			<u>A</u>
Bacillariophyceae Haeckel			
Acanthocerataceae Crawford			
Aulacoseira granulata var. granulata (Ehrenberg) Simonsen			x
Aulacoseira granulata var. angustissima (O. Müller) Simonsen	x	x	x
Fragilariaceae Hustedt			
Fragilaria ulna (Nitzsch) Lange-Bertalot			х
Naviculaceae Kutzing			
Navicula cryptocephala Kutzing			X
Navicula sp.		X	
Pinnulariaceae Mann in Round et al.			
Pinnularia divergens W. Smith			Х
Pinnularia interrupta Smith.		X	
Pinnularia microstauron (Ehrenberg) Cleve		X	х
Pinnularia sp.		X	
Stauroneidaceae Mann			
Stauroneis phoenicenteron (Nitzsch) Ehrenberg	x		x
Stauroneis sp.			X
Surirellaceae Kutzing			
Surirella sp.	х		
Chrysophyceae Pascher			
Pleurochloridaceae Pascher			
Pseudostaurastrum gracile (Reinsch) Chodat ex Bourrelly	X		X
Chlorophyta Cavalier-Smith Chlorophytacae Willo in Warming			
Chlorophyceae Wille in Warming Ankistrodesmaceae Korshikov			
Ankistrodesmus gracillis (Reinsch) Korshikov	X		
Ankistrodesmus fusiformis Corda			х
Botryococcaceae Wille			
Dictyosphaerium pulchellum Van Goore	х	x	
Selenastraceae Blackman and Tansley			
Kirchneriella obesa (West & G.S. West) Schmidle			x
Hydrodictyaceae (Gray) Dumortier			-
Pediastrum biradiatum Meyen	x		
Pediastrum duplex Meyen		X	
Pediastrum duplex Meyen var. gracillimum West and GS West	x	x	x
	A	A	
Pediastrum tetras (Ehrenberg) Ralfs			X
Pediastrum simplex Meyen	X		
Neochloridaceae Ettl and Komarek			
Tetraedron trigonum (Nägeli) Hansgirg	Х	X	Х

Identification sp.NIdentification sp.NConstrum marker from boardsNConstrum marker from Section with the sp.NConstrum marker from Section with the sp.NSection with the sp.N			(
Colours and actual constrainedImageNColumna actual constrainedNNColumna actual constrainedNNColumna actual constrainedNNConsegnicity actual constrainedNNConsegnicity actual constrainedNNConsegnicity actual constrainedNNSecond constrained constrainedNNSecond constrained constrainedNNSecond constrained constrainedNNSecond constrained constrainedNNSecond constrained constrained constrained constrainedNNSecond constrained	Tetraedron sp.			X
Coloursen onforms Schule Schul				
Cacharom cambrican W. Acker				
Ceclarizen nicroprone Napel Coclustrom phicknes Schedules Construme Anticome Construme				
Celestron public models of the second				
Cracegone journal panel Moren in a subset of the second se		x		A
Craigenetia rectangulari (Ngeli) Konaek X X X X X X X X X X X X X X X X X X X				х
Konclosume acutiforms SchöndexxScendessen Correlation ChangexxScendessen Stranger ChangexxScendessen Stranger ChangexxScendessen Stranger ChangerxxScendessen Stranger ChangerxxScendessen Stranger Changer Changer ChangerxxScendessen Stranger Changer C			х	
Sendensen hormanik Cookat Sendersen hormanik Constraints and Sendersen hormanik Deblassen hormanik Constraints and Sendersen hormanik Deblassen hormanik Constraints and Sendersen hormanik Con		х		х
Senderson bicaulous Debusenho solutions bicaulous of the senderson arguing il Brebison in a senderson arguing il Brebison in a senderson arguing il Brebison in a senderson arguing in arguing and in a senderson arguing arguing arguing in a senderson arguing argui	Scenedesmus acutiformis Schröde	х		
Serendenma number letting and the series of	Scenedesmus bernardii Chodat		х	х
Seendemus anifhi Telling Seendemus anifhi Telling Seendemus anifhi Telling Seendemus and Seendemus a	Scenedesmus bicaudatus Dedussenko			х
Seenelemin op			х	
Dimorphoecocan landia A Brain San I in a second sec				
Demolections denications (Lagenbein) SSAnDemolections denizationations (Unpin) HegevaldxXValocaces EntenbergxXEndoris edgess RhubbergxXConstrain norum (Müller) BreyXXConstrain norum (Müller) BreyXXClosterina loca: KatingXXClosterina loca: KatingXXClosterina loca: KatingXXClosterina loca: Angli DevisionXXClosterina loca: Angli DevisionXXClosterina loca: Angli DevisionXXComarium sequelocies Online SchingliXXComarium sequelocies Nutring et RalfsXXComarium sequelocies Nutring et RalfsXXComarium Neutro MestiXXXComarium Neutro MestiXXXComarium Mary Angle (Talls) WarberXXXComarium Mary Angle Malls OutputXXXStaurastrant lepicolatin var. corratum WilleXXXStaurastrant lepicolatin var. corratum WilleX				X
Deemodennus quadricandatus (Turpin) HegevaldxxxEndorine orugin (Maller) BoryxxxEndorine orugin (Maller) BoryxxxConjugatophycene EnglerxxxConjugatophycene EnglerxxxCostericene ResexyxxxClosterium Macringi BrebbasonxxxClosterium Accinging BrebbasonxxxClosterium Accinging BrebbasonxxxClosterium SpillxxxComarium Contraction O. MirchnerxxxComarium Contraction O. MirchnerxxxComarium Contraction O. MirchnerxxxComarium SpillxxxxComarium SpillxxxxComarium SpillxxxxComarium SpillxxxxComarium SpillxxxxSucuratium fertocladum var. comutam WillexxxSucuratium fertocladum var. comutam WillexxxSucuratium fertocladum var. comutam WillexxxEnglenoptovece ScheenichenxxxxEnglenoptovece ScheenichenxxxxEnglenoptovece ScheenichenxxxxEnglenoptovece ScheenichenxxxxEnglenoptovece Scheenichenxxxx			X	
Valvoacese EhrenbergxxPandorise degua EhrenbergxxPandorise morum (Mülle) Bay:xxClosterine more RutringxxClosterine more RutringxxClosterine Maxer RutringxxCommarium Rutring-Abaped RutringxxCommarium Rutring-Abaped RutringxxCommarium Rutring-Abaped RutringxxCommarium RutringxxxCommarium RutringxxxCommarium RutringxxxCommarium RutringxxxCommarium RutringxxxCommarium RutringxxxStaurastrum Retricterum RuffsxxxCommarium RutringxxxxCommarium RutringxxxxCommarium RutringxxxxCommarium RutringxxxxCommarium RutringxxxxCommarium Rutring Rutring RutringxxxCommarium Rutring Rutring RutringxxxCommarium R				
Endoring lengen lineabergxxxConjugophycae EnglerxxConjugophycae EnglerxxClostericue Steping BrebhsonxxClostericue Macring BrebhsonxxClosterium Agen KutzingxxClosterium Spl.xxClosterium Spl.xxClosterium spl.xxCommun Schung Consolition O. KucharetxxCommun Schung StaffsxxCommun Schung StaffsxxCommun Schung StaffsxxCommun Schung StaffsxxCommun Schung StaffsxxCommun Schung StaffsxxCommun StaffsxxSumastran Artensem ReffsxxSumastran Artensem Reffsxx <t< td=""><td></td><td>X</td><td></td><td>X</td></t<>		X		X
Pandorsa morum (Muller) BoryxClosterine users EnglerxClosterine users KutzingxClosterine Mack Stragil BebissonxClosterine Mack Stragil BebissonxClosterine Mack Stragil BebissonxClosterine Mack Stragil BebissonxClosterine Strage Stragil BebissonxClosterine Strage Stragil BebissonxClosterine Strage Stragil BebissonxComariani motivation O. KurchnerxComariani motivation VestxCosmariani Machan VestxCosmariani Machan VestxCosmariani Machan VestxCosmariani Ng-Landorevantam WellexCosmariani Ng-Landorevantam WellexSumarstran Attracterine MalksxSumarstran Attracterine Malks		v		v
Conjugatophycea Engler Construine Jeres Kutzing Closterium Jeres Kutzing Closterium Jeres Kutzing Closterium Jeres Kutzing Closterium sp.1 Closterium sp.1 Closterium sp.2 Closterium sp.2 Closterium p.2 Closterium vecatum Schimile Closterium vecatum Schimile Closterium vecatum Schimile Closterium vecatum Vest Closterium Ve		X		
Clostering laws KatingImage: State Strain Strai				Λ
Closterium laver Kutzing x x Closterium sp.1 x x Closterium sp.1 x x Cosmarium Contraction O. Krehner x x Cosmarium Contraction O. Krehner x x Cosmarium Neurologio O. Krehner x x Cosmarium Neurologio O. Krehner x x Cosmarium Vextam West x x Cosmarium Vextam West x x Cosmarium Neurologio O. Scheener x x Cosmarium Vextam Repo x x Cosmarium Vextam Repo x x Staurastrum teracerum Rahi x x Staurastrum teracerum Rahi x x Euglenophyth Pascher - - Euglenophyth Pascher - - Euglenophyth Pascher - - Euglenotexit Ströther x x Euglenotexit Ströther x				
Closterium que tingei Bebisson x Closterium qp.1 x Construim qp.2 x Commun gue audidecoratus Schmide x Sauratum teptocladum war. comutum Wille x Sauratum teptocladum war. comutum Wille <td></td> <td></td> <td>x</td> <td></td>			x	
Closterium sp.1 x Closterium sp.2 x Comartum contraction O. Kirchner x Comartum contraction O. Kirchner x Comartum pseudodecoratum Schimile x Comartum pseudodecoratum Schimile x Comartum vectatum West x Comartum vectatum West x Comartum sp.2 x Comartum sp.1 x Comartum sp.1 x Successtrum tetracerum Rafts x Successtrum tetracerum Rafts x Successtrum tetracerum Rafts x Successtrum tetracerum Rafts x Euglencophythe pascher	5			x
Closterium sp.2 x Commun contraction O. Kirchner x Commun contraction O. Kirchner x Commun Kindog-schaped (Ralfs) W. Archer x Commun Kindog-schaped (Ralfs) W. Archer x Commun Kindog-schaped (Ralfs) W. Archer x Commun Sp.1 x Commun Sp.1 x Commun Sp.2 x Summatrum Interneture Ralfs x Summatrum Interneture x Supplex Ralfs x			x	
Desmitiacea Kitzing ex Ralfs Community metacion O. Kirchner Community metacion O. Kirchner Community metacion O. Kirchner Community of the second of the sec				x
Cosmarium protection Co. SinchnerxCosmarium protection when y-shaped (Ralis) W. ArcherxCosmarium vestatum WestxCosmarium sp.1xCosmarium sp.2xStauraturm (procloalum var. comutum WillexStauraturm (procloalum var. comutum WillexStauraturm sp.1xStauraturm (procloalum var. comutum WillexStauraturm sp.1xStauraturm sp.1xEnglence ScheenichenxEnglence Scheenichen<				
Cosmarium Vestum WestxCosmarium Vestum WestxCosmarium sp.1xCosmarium sp.2xSucurstrum Inspectadum var. cornuum WillexSucurstrum Var. Sucurstrum var. S			х	
Community vectorxxCommunity sp.1xxCommunity sp.2xxCommunity sp.2xxStaurature intracerum RalfsxxStaurature intracerum RalfsxxStagleen provingen RalfsxxLegocincits introm (Schnarda) Marin and MelkonianxxLepocincits introm (Schnarda) Ma	Cosmarium pseudodecoratum Schimile			х
Commution sp.1xxStaurastrum leptocladum var. cornutum WillexStaurastrum leptocladum var. cornutum WillexStaurastrum letracerum RalfsxStaurastrum letracerum RalfsxStaurastrum sp.1xTeilingia granulata (Roy and Bisset) BourrellyxEuglenophytese SchoenichenxEuglenophytese SchoenichenxEuglenophytese SchoenichenxEuglenocki Kurdin PascherxEuglenocki Kurdin PascherxEuglenocki Kurdin PascherxEuglenocki Kurdin PascherxEuglenocki Kurdin PascherxEuglenocki Kurdin PascherxLepocinchi Cascu (Nuller) Marin and MelkonianxxxLepocinchi Cascu (Nuller) Marin and MelkonianxxxLepocinchi statu (Dujatin) LemmermanxxxPlacus angulatus PochmannxPhacus Broglenado var. Iongicauda (Ehrenberg) DujardinxxxPhacus Bongicauda var. Iongicauda (Ehrenberg) Dujardinxxx <td< td=""><td></td><td></td><td></td><td>x</td></td<>				x
Community of the second seco			x	
Staurastrum leptocladum var. corrutum Wille x x Staurastrum traverum Ralfs x x Staurastrum traverum Ralfs x x Fallingia grannlau (Roy and Bisset) Bourrelly x x Euglenophyte Pascher x x Euglenophyte Pascher x x Euglenophyte Schoenichen x x Lepocinclis aux (Muller) Marin and Melkonian x x Lepocinclis aux (Duller) Lemmerman x x x Lepocinclis aux (Duller) Lemmerman x x x Lepocinclis aux (Duller) Marin and Melkonian x x x Lepocinclis aux (Duller) Lemmerman x x x Lepocinclis aux (Duller) Marin and Melkonian x x x Lepocinclis aux (Duller) Marin and Melkonian x x x Lepocinclis aux (Duller) Marin Lemmerman x x x Lepocinclis aux (Duller) Marin and Melkonian x x x Lepocinclis aux (Duller) Marin aux x x x <td></td> <td></td> <td>х</td> <td>х</td>			х	х
Staurastrum fariacerum Ralfs x x Teilingia granulati (Roy and Bisset) Bourrelly x x Euglenophyta Pascher x x Euglenoprotyteas Schoenichen x x Euglenoprotyteas Schoenichen x x Lepocitich journom Ya, Pinworm X, Pinworm (Schmarda) Marin and Melkonian x x Lepocitich sournom Teichenvern (Schmarda) Marin and Melkonian x x Lepocitich sournom Fritscher x x x Lepocitich sournom Tristowern (Schmarda) Marin and Melkonian x x x Lepocitich sournom Tristowern (Schmarda) Marin and Melkonian x x x Lepocitich sournom Tristowern (Schmarda) Marin and Melkonian x x x Lepocitich sournom Teinewernan x x x x Lepocitich sournom Teinewernan x x x Phacus longicauda var. tori Lemmerman x x x Phacus longicauda var. tori Lemmerman x x x Phacus longicauda var. tori Lemmerman x x<				
Staurastrum sp.1 x x Euglenophytea Schoenichen x x Euglenophytea Schoenichen x x Euglenophytea Schoenichen x x Euglenotex Schoenichen x x Euglenotex Schoenichen x x Euglenotex Schoenichen x x Euglenotex Schoenichen x x Lepocinclis curve Direnberg x x Lepocinclis schoeniker x x Phacus langicuuda Var. longicuuda (Ehrenberg) Dujardin x x Phacus longicuuda var. lorbi Lemmermann x x Phacus longicuuda var. lorbi Lemmermann </td <td></td> <td></td> <td></td> <td></td>				
Teilingi granulara (Roy and Bisset) BourrellyxxxEuglenophyte Pascher			X	
Euglenophytes SchoenichenImage: SchoenichenImage: SchoenichenEuglenoptes SchoenichenxxEuglenotes SchoenichenxxEugenotes SchoenichenxxEugenotes SchoenichenxxLepocitelis case (Muller) Marin and MelkonianxxLepocitelis case (Muller) Marin and MelkonianxxLepocitelis case (Muller) Marin and MelkonianxxLepocitelis valum EntrobergxxLepocitelis valum EntrobergxxLepocitelis statu Dijardin LemmermanxxLepocitelis statu Dijardin LemmermanxxPhacus angulatus PochmannxxPhacus angulatus PochmannxxPhacus fongicuida (Entroberg) DujardinxxPhacus fongicuida var. toral LemmermanxxPhacus fongicuida var. toral LemmermanxxPhacus platilea Drezepolski	Staurastrum sp.1			
Englenophyceae SchoenichenImage: Constraint of the second science of the second scien			X	X
Englenacene SteinEuglena proxima P.A. DangeardxxLepocinclis caus(Müller) Marin and MelkonianxxLepocinclis ware EncohergxxLepocinclis setta (Dujardin) LemmermanxxLepocinclis sp.xxPhacus glader PochmannxxPhacus fabre PochmannxxPhacus fabre PochmannxxPhacus fabre PochmannxxPhacus fabre DochmannxxPhacus fabre and clicenarda (Ehrenberg) DujardinxxPhacus fabre and a constraintxxPhacus fabre and a constraintxxPhacus fabre and a constraintxxPhacus fabre and a constraintxxPhacus pleuronectes (Müller) DujardinxxPhacus sp.1xxxPhacus sp.2xxStrombononas ducuninat (Schmarda) DeflandrexxStrombononas giberosa (Playfair) DeflandrexxStrombononas giberosa (Playfair) DeflandrexxStrombononas giberosa (Playfair) DeflandrexxTrachelononas armata var gradetexi (SkvortzovxxTrachelononas armata var gradetexi (Skvortzovxx<				
Englena proxima P.A. DangeardxxxLepocinclis orus (Muller) Marin and MelkonianxxxLepocinclis orum EhrenbergxxxLepocinclis orum EhrenbergxxxLepocinclis strate (Dujardin) LemmermanxxxLepocinclis setta (Dujardin) LemmermanxxxLepocinclis setta (Dujardin) LemmermanxxxPhacus agulatus PochmannxxxPhacus agulatus PochmannxxxPhacus agulatus PochmannxxxPhacus agulatus PochmannxxxPhacus longicauda var. longicauda (Ehrenberg) DujardinxxxPhacus longicauda var. longicauda (Ehrenberg) DujardinxxxPhacus longicauda var. longicauda (Ehrenberg) DujardinxxxPhacus plearonectes (Miller) DujardinxxxxPhacus splearonectes (Miller) Dujardinxxxx				
Lepocinclis acus(Müller) Marin and MelkonianxxxLepocinclis our EhrenbergxxxLepocinclis our EhrenbergxxxLepocinclis our EhrenbergxxxLepocinclis valume FritscherxxxLepocinclis text (Dujardin) LemmermanxxxLepocinclis sp.xxxPhacus angulatus PochmannxxxPhacus angulatus PochmannxxxPhacus longicauda var. torta LemmermannxxxPhacus plate DrezpolskixxxxPhacus plate DrezpolskixxxxPhacus plate DrezpolskixxxxPhacus sp.1xxxxxPhacus sp.2xxxxxStrombononas acuminata (Schmarda) DeflandrexxxxStrombononas giberiar (Playfair) DeflandrexxxxStrombononas giberiar (Playfair) DeflandrexxxxTrachelononas armatu av. gordeieut SkovtzovxxxxTrachelononas armatu av. gordeieut SkovtzovxxxxTrachelono		v	v	
Lepocinclis pinworm var. pinworm (Schmarda) Marin and Melkonian x x x x Lepocinclis solima Fritscher x x x x Lepocinclis texta (Dujardin) Lemmerman x x x x Lepocinclis solima Fritscher x x x x Lepocinclis texta (Dujardin) Lemmerman x x x x Phacus angulatus Pochmann x x x x Phacus longicauda var. longicauda (Ehrenberg) Dujardin x x x Phacus longicauda var. longicauda (Ehrenberg) Dujardin x x x Phacus longicauda var. longicauda (Ehrenberg) Dujardin x x x Phacus longicauda var. longicauda (Ehrenberg) Dujardin x x x Phacus longicauta var. longicauda (Ehrenberg) x x x Phacus longicauta var. sorta x x x Phacus sp.2 x		Λ		
Lepocinclis ourum EhrenbergxxxxLepocinclis stalura FritscherxxxxLepocinclis stext (Dujardin) LemmermanxxxxLepocinclis stext (Dujardin) LemmermanxxxxPhacus angulatis PochmannxxxxPhacus angulatis PochmannxxxxPhacus filder PochmannxxxxPhacus longicauda var. torta LemmermannxxxxPhacus pleuronectes (Müller) DujardinxxxxPhacus spleuronectes (Müller) DujardinxxxxPhacus splatalea DrezepolskixxxxPhacus splatis LemermannxxxxxPhacus splatis Lemermann) SkortzovxxxxxStrombononas acuminata (Schmarda) DeflandrexxxxStrombononas giberosa (Playfair) DeflandrexxxxStrombononas giberosa (Playfair) DeflandrexxxxTrachelomonas armata (Ehrenberg) F. SteinxxxxTrachelomonas armata vargordeievi Skvortzovx <td< td=""><td></td><td></td><td></td><td></td></td<>				
Lepocinciis texta (Dujardin) LemmermanxxxxLepocinciis sp.xxxPhacus angulatus PochmannxxPhacus angulatus PochmannxxPhacus angulatus PochmannxxPhacus angulatus PochmannxxPhacus longicauda var. longicauda (Ehrenberg) DujardinxxPhacus platalea DrezepolskixxPhacus suecicus LemermannxxPhacus suecicus LemermannxxPhacus sp.1xxPhacus sp.2xxStrombomonas fluviatilis (Lemmermann) DeflandrexxStrombomonas gibberosa (Playfair) DeflandrexxStrombomonas gibberosa (Playfair) DeflandrexxStrombomonas gibberosa (Playfair) DeflandrexxTrachelomonas signardiana (Playfair) DeflandrexxTrachelomonas surgata VirenkoxxTrachelomonas surgata VirenkoxxTrachelomonas surgata VirenkoxxTrachelomonas surgata VirenkoxxTrachelomonas surgata VirenkoxxTrachelomonas shipida Virenko </td <td></td> <td>X</td> <td></td> <td></td>		X		
Lepocinclis texta (Dujardin) LemmermanxxxxLepocinclis sp.xPhacus argulatus PochmannxPhacus argulatus PochmannxxPhacus argulatus PochmannxxPhacus longicauda var. tora LemmermannxxxPhacus longicauda var. tora LemmermannxxxPhacus longicauda var. tora LemmermannxxxPhacus ony PochmannxxxxPhacus platalea DrezepolskixxxPhacus platalea DrezepolskixxxPhacus spicicus LemermannxxxxPhacus spicicus LemermannxxxxPhacus spicicus Lemermann) SkvortzovxxxxPhacus spicicus Lemermann) DeflandrexxxxStrombomonas acumitata (Schmarda) DeflandrexxxxStrombomonas gibberosa (Playfair) DeflandrexxxxStrombomonas gibberosa (Playfair) DeflandrexxxxTrachelononas sharudata Var, gordeivit SkortzovxxxxTrachelononas sharudata Var, gordeivit SkortzovxxxxTrachelononas sharudata Var, gordeivit SkortzovxxxxTrachelononas shiribida var. creuulatoollis (Maskel) LemmermannxxxxTrachelononas shiribida var. creuulatocollis (Maskel) Lemmerma		v		
Lepocincils sp.xxPhacus gladus PochmannxxPhacus gladve PochmannxxPhacus gladve PochmannxxPhacus logicauda var. longicauda (Ehrenberg) DujardinxxPhacus longicauda var. longicauda (Ehrenberg) DujardinxxPhacus plaulea DrezepolskixxPhacus plaunocetes (Müller) DujardinxxPhacus sucicus LemermannxxPhacus sucicus LemermannxxPhacus sp.1xxPhacus sp.2xxStrombononas gluviatilis (Lemmermann) DeflandrexxStrombomonas giurviatur (Playfair) DeflandrexxStrombononas giurviatur (Playfair) DeflandrexxStrombomonas spiardiana (Playfair) DeflandrexxStrombomonas spiardiana (Playfair) DeflandrexxTrachelomonas spiardiana (Schmarda) DeflandrexxTrachelomonas spiardiana (Playfair) DeflandrexxStrombomonas spiardiana (Playfair) DeflandrexxTrachelomonas spiardiana (Playfair) DeflandrexxTrachelomonas spiardiana (Playfair) DeflandrexxTrachelomonas shruja (Yertey) SteinxxTrachelomonas shruja (Yertey) SteinxxTrach				
Phacus angulatus PochmannxxPhacus glaber PochmannxPhacus keini LefevrexPhacus longicauda var. longicauda (Ehrenberg) DujardinxXxPhacus longicauda var. longi (Ehrenberg) DujardinxXxPhacus ony RobinannxXxPhacus ony RobinannxXxPhacus ony RobinannxXxPhacus ony RobinannxXxPhacus platileo DrezepolskiPhacus spleturonectes (Müller) DujardinxXxPhacus spleturonectes (Müller) DujardinXxPhacus sp.1Phacus sp.2xStrombomonas fluviatilis (Lemmermann) DeflandreXrombomonas fluviatilis (Lemmermann) DeflandreXrombomonas glivaridina (Playfair) DeflandreXrombomonas glivaridina (Playfair) DeflandreXrombomonas glivaridina (Playfair) DeflandreXrombomonas adrucelata (Ilayfair) DeflandreXrombomonas adrucelata (Davin DeflandreXrombomonas adrucelata (Davin DeflandreXrombomonas adrucelata (Davin DeflandreXrombomonas adrucelata (Davin DeflandreXrachelomonas adruta var. gordeievii SkvortzovXXrachelomonas adruta (Schmerdo) F. SteinXTrachelomonas adruta var. gordeievii SkvortzovXXrachelomonas splida var. crenulatoollis (Maskel) LemmermannXXrachelomonas splida var. crenulatoollis (Maskel) LemmermannXXrachelomona		A	Λ	
Phacus glaber PochmannxPhacus longicauda var. longicauda (Ehrenberg) DujardinxxPhacus longicauda var. torta LemmermannxxPhacus longicauda var. torta LemmermannxxPhacus longicauda var. torta LemmermannxxPhacus longicauda var. torta LemmermannxxPhacus pleuronectes (Müller) DujardinxxPhacus pleuronectes (Müller) DujardinxxPhacus splatalea DrezepolskixxPhacus spressen (Lemermann)xxPhacus spressen (Lemermann)xxPhacus sp.1xxPhacus sp.2xxStrombomonas glubiensa (Playfair) DeflandrexxStrombomonas glubiensa (Daday) DeflandrexxStrombomas sprentumxxxStrombomonas ginardiana (Playfair) DeflandrexxStrombomas sprentumxxxStrombomonas ginardiana (Playfair) DeflandrexxStrombomonas ginardiana (Playfair) DeflandrexxStrombomonas grandiana (Playfair) DeflandrexxStrombomonas grandiana (Playfair) DeflandrexxStrombomonas grandiana (Playfair) DeflandrexxStrombomonas grandian		x		А
Phacus heimii LefevrexxPhacus longicauda var. longicauda (Ehrenberg) DujardinxxPhacus longicauda var. longicauda (Ehrenberg) DujardinxxPhacus onx PochmannxxPhacus onx PochmannxxPhacus platalea DrezepolskixxPhacus platalea DrezepolskixxPhacus platalea DrezepolskixxPhacus splatalea DrezepolskixxStrombononas gluviatilis (Lemmermann) DeflandrexxStrombononas gibberosa (Playfair) DeflandrexxStrombononas splata SvienkoxxTrachelononas armata var. gordeievii SkvortzovxxTrachelononas armata var. gordeievii SkvortzovxxTrachelononas shipida var. hispida var. displataleanesis Vischerxx		A		x
Phacus longicauda var. longicauda (Ehrenberg) DujardinxxxPhacus longicauda var. torta LemmermannxxxPhacus onyx PochmannxxxPhacus opyx PochmannxxxPhacus opyx PochmannxxxPhacus opyx PochmannxxxPhacus spleuronectes (Müller) DujardinxxxPhacus spleuronectes (Müller) DujardinxxxPhacus spleuronectes (Müller) DujardinxxxPhacus spleuronectes (Müller) DujardinxxxPhacus sp.1xxxxPhacus sp.2xxxxStrombononas fluviatilis (Lemmermann) DeflandrexxxStrombononas giberosa (Playfair) DeflandrexxxStrombononas giaradiana (Playfair) DeflandrexxxStrombononas sp.xxxxTrachelomonas armata (Ehrenberg) F. SteinxxxTrachelomonas armata (Ieneberg) F. SteinxxxTrachelomonas hispida var. hispida (Perty SteinxxxTrachelomonas hispida var. hispida (Perty SteinxxxTrachelomonas splifis StokesxxxTrachelomonas similis StokesxxxTrachelomonas similis StokesxxxTrachelomonas sinilis StokesxxxTrachelomonas sinilis Stokesxxx </td <td>0</td> <td></td> <td>X</td> <td></td>	0		X	
Phacus only PochmannxxxxPhacus platalea Drezepolski	Phacus longicauda var. longicauda (Ehrenberg) Dujardin	х		х
Phacus platalea DrezepolskixPhacus pleuronectes (Müller) DujardinxxPhacus spleuronectes (Müller) DujardinxxPhacus suecicus LemermannxxPhacus sortus (Lemermann) SkvortzovxxPhacus sp.1xxPhacus sp.2xxStrombomonas acuminata (Schmarda) DeflandrexxStrombomonas gluviatilis (Lemmermann) DeflanderxxStrombomonas giberosa (Playfair) DeflandrexxStrombomonas giaradiana (Playfair) DeflandrexxStrombomonas pluviatilis (Lemmermann) DeflandrexxStrombomonas giaradiana (Playfair) DeflandrexxStrombomonas verrucosa (Daday) DeflandrexxStrombomonas abupta SvirenkoxxTrachelomonas armata (Ehrenberg) F. SteinxxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxxTrachelomonas pisciformis PrescottxxxTrachelomonas volvocina EhrenbergxxxTrachelomonas volvocina EhrenbergxxxTrachelomonas volvocina EhrenbergxxxTrachelomonas solutoria EhrenbergxxxTrachelomonas solutoria EhrenbergxxxTrachelomonas solutoria EhrenbergxxxTrachelomonas solutoria EhrenbergxxxTrachelomonas solutor			х	
Phacus pleuronectes (Müller) DujardinxxxPhacus suecicus LemermannxxxPhacus sortus (Lemermann) SkvortzovxxxPhacus sp.1xxxPhacus sp.2xxxStrombomonas acuiniata (Schmarda) DeflandrexxxStrombomonas gibberosa (Playfair) DeflandrexxxStrombomonas giaberosa (Playfair) DeflandrexxxStrombomonas giaberosa (Playfair) DeflandrexxxStrombomonas giaberosa (Playfair) DeflandrexxxStrombomonas giaberosa (Playfair) DeflandrexxxStrombomonas girardiana (Playfair) DeflandrexxxStrombomonas verucosa (Daday) DeflandrexxxTrachelomonas annata var_gordeievii SkvotzovxxxTrachelomonas armata (Ehrenberg) F. SteinxxxTrachelomonas bipida var. crenulatocollis (Maskel) LemmermannxxxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxxxTrachelomonas splis StokesxxxxTrachelomonas splis StokesxxxxTrachelomonas splis StokesxxxxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxxxTrachelomonas splis StokesxxxxTrachelomonas splis StokesxxxxTrachelomonas		х	х	Х
Phacus suecicus LemermannxxxPhacus strus (Lemermann) SkvortzovxxxPhacus sp.1xxxPhacus sp.2xxxStrombomonas acuminata (Schmarda) DeflandrexxxStrombomonas fluviatilis (Lemmermann) DeflandrexxxStrombomonas gibberosa (Playfair) DeflandrexxxStrombomonas gibarosa (Playfair) DeflandrexxxStrombomonas gibarosa (Playfair) DeflandrexxxStrombomonas ginardiana (Playfair) DeflandrexxxStrombomonas superscolata (Playfair) DeflandrexxxStrombomonas anuta (SchmerkonxxxxStrombomonas armata vargordeievii SkvortzovxxxxTrachelomonas armata vargordeievii SkvortzovxxxxTrachelomonas hispida vartispida (Perty SteinxxxxTrachelomonas polonga LemmermannxxxxxTrachelomonas suilis StokesxxxxxTrachelomonas syligi StokesxxxxxTrachelomonas syligi StokesxxxxxTrachelomonas polycocinopsis SvirenkoxxxxTrachelomonas polycocinopsis SvirenkoxxxxTrachelomonas syligi StokesxxxxTrachelomonas sp.1xxx <t< td=""><td>Phacus platalea Drezepolski</td><td></td><td></td><td>х</td></t<>	Phacus platalea Drezepolski			х
Phacus tortus (Lemermann) SkvortzovxxPhacus sp.1xxPhacus sp.2xxStrombomonas acuminata (Schmarda) DeflandrexxStrombomonas fluviatilis (Lemmermann) DeflandrexxStrombomonas gibberosa (Playfair) DeflandrexxStrombomonas girardiana (Playfair) DeflandrexxStrombomonas lanceolata (Playfair) DeflandrexxStrombomonas verrucosa (Daday) DeflandrexxStrombomonas sp.xxTrachelomonas armata (Ehrenberg) F. SteinxxTrachelomonas armata var .gordeievii SkvortzovxxTrachelomonas hispida varerunlatocollis (Maskel) LemmermannxxTrachelomonas splitifs StokesxxxTrachelomonas sinilis StokesxxxTrachelomonas synlitis StokesxxxTrachelomonas spilifs stokesxxxTrachelomonas hispida (Perty SteinxxxTrachelomonas spilifs StokesxxxTrachelomonas spilifs Stokesxx <td< td=""><td>Phacus pleuronectes (Müller) Dujardin</td><td></td><td>х</td><td>х</td></td<>	Phacus pleuronectes (Müller) Dujardin		х	х
Phacus sp.1xxPhacus sp.2xxStrombomonas acuminata (Schmarda) DeflandrexxStrombomonas fluviatiis (Lemmermann) DeflandrexxStrombomonas gibberosa (Playfair) DeflandrexxStrombomonas girardiana (Playfair) DeflandrexxStrombomonas girardiana (Playfair) DeflandrexxStrombomonas girardiana (Playfair) DeflandrexxStrombomonas lanceolata (Playfair) DeflandrexxStrombomonas verrucosa (Daday) DeflandrexxStrombomonas sp.xxStrombomonas annata (Ehrenberg) F. SteinxxTrachelomonas armata (Ehrenberg) F. SteinxxTrachelomonas armata var. gordeievii SkvortzovxxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxxTrachelomonas phispida var. crenulatocollis (Maskel) LemmermannxxTrachelomonas suilis StokesxxxTrachelomonas splafairxxxTrachelomonas splaxxxTrachelomonas splaxxxTrachelomonas splaxxx </td <td></td> <td>х</td> <td></td> <td>х</td>		х		х
Phacus sp.2xxStrombomonas acuminata (Schmarda) DeflandrexxStrombomonas fluviatiis (Lemmermann) DeflanderxxStrombomonas gibberosa (Playfair) DeflandrexxStrombomonas gibberosa (Playfair) DeflandrexxStrombomonas girardiana (Playfair) DeflandrexxStrombomonas girardiana (Playfair) DeflandrexxStrombomonas verrucosa (Daday) DeflandrexxStrombomonas spi.xxStrombomonas admuta (Ehrenberg) F. SteinxxTrachelomonas armata (Ehrenberg) F. SteinxxTrachelomonas hipida var. cenulatocollis (Maskel) LemmermannxxTrachelomonas hipida var. dispida (Perty SteinxxTrachelomonas pisciformis PrescottxxTrachelomonas sinilis StokesxxTrachelomonas volvocina EhrenbergxxTrachelomonas volvocina StrigenxxTrachelomonas spi.2xxTrachelomonas hispila var. formulatocollis (Maskel) LemmermannxTrachelomonas volvocina bistokesxxTrachelomonas volvocina EhrenbergxxTrachelomonas volvocina EhrenbergxxTrachelomonas spi.2xxTrachelomonas spi.3xxTrachelomonas spi.3xxTrachelomonas spi.3xxTrachelomonas spi.3xxTrachelomonas spi.3xxTrachelomonas spi.3xx			X	X
Strombornas acuminata (Schmarda) DeflandrexStrombornas fluviatilis (Lemmermann) DeflanderxxStrombornas gibberosa (Playfair) DeflandrexxStrombornas girardiana (Playfair) DeflandrexxStrombornas lanceolata (Playfair) DeflandrexxStrombornas spinardiana (Playfair) DeflandrexxStrombornas verrucosa (Daday) DeflandrexxStrombornas spinardiana (Playfair) DeflandrexxStrombornas verucosa (Daday) DeflandrexxStrombornas spinardiana (Playfair) DeflandrexxStrombornas spinardiana (Playfair) DeflandrexxStrombornas verucosa (Daday) DeflandrexxStrombornas spinardiana (Playfair) DeflandrexxStrombornas verucosa (Daday) DeflandrexxStrombornas spinardiana (Playfair) DeflandrexxStrombornas spinardiana (Playfair) DeflandrexxStrombornas spinardiana (Playfair) DeflandrexxStrombornas spinardiana (Playfair) DeflandrexxTrachelomonas andra (Ehrenberg) F. SteinxxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxxTrachelomonas poling a LemmermannxxxTrachelomonas sinilis StokesxxxTrachelomonas sydneyensis PlayfairxxxTrachelomonas volvocina Ehrenbergxxx <td></td> <td>X</td> <td></td> <td></td>		X		
Strombomonas fluviatilis (Lemmermann) DeflanderxxStrombomonas gibberosa (Playfair) Deflandrex.Strombomonas girardiana (Playfair) DeflandrexStrombomonas lanceolata (Playfair) DeflandrexStrombomonas verucosa (Daday) DeflandrexStrombomonas spxTrachelomonas abrupta SvirenkoxTrachelomonas armata (Ehrenberg) F. SteinxTrachelomonas bernardinensis VischerxTrachelomonas bernardinensis VischerxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxTrachelomonas sinilis StokesxxTrachelomonas sinilis Stokes.xTrachelomonas volvocina EhrenbergxxTrachelomonas pisciformis PrescottxxTrachelomonas volvocina Sis PlayfairxTrachelomonas volvocina Sis PlayfairxTrachelomonas sp.1Trachelomonas sp.3Trachelomonas sp.3Trachelomonas sp.3Trachelomonas sp.1.			X	
Strombomonas gibberosa (Playfair) DeflandrexImage: constraint of the systemStrombomonas girardiana (Playfair) DeflandrexStrombomonas lanceolata (Playfair) DeflandrexStrombomonas lanceolata (Playfair) DeflandrexStrombomonas verrucosa (Daday) DeflandrexStrombomonas sp.xStrombomonas sp.xTrachelomonas abrupta SvirenkoxTrachelomonas armata (Ehrenberg) F. SteinxTrachelomonas armata var .gordeievii SkvortzovxTrachelomonas bernardinensis VischerxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxTrachelomonas pisciformis PrescottxTrachelomonas similis StokesxTrachelomonas similis StokesxTrachelomonas volvocina EhrenbergxTrachelomonas volvocinopsis SvirenkoxTrachelomonas p.1xTrachelomonas p.3xTrachelomonas sp.3x	Strombomonas acuminata (Schmarda) Deflandre			
Strombomonas girardiana (Playfair) DeflandrexStrombomonas lanceolata (Playfair) DeflandrexStrombomonas verrucosa (Daday) DeflandrexStrombomonas verrucosa (Daday) DeflandrexStrombomonas sp.xTrachelomonas abrupta SvirenkoxTrachelomonas armata (Ehrenberg) F. SteinxTrachelomonas armata var.gordeievii SkvortzovxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxTrachelomonas bispida var. hispida (Perty)SteinxTrachelomonas bispida var. hispida (Perty)SteinxTrachelomonas similis StokesxTrachelomonas similis StokesxTrachelomonas similis StokesxTrachelomonas similis StokesxTrachelomonas similis StokesxTrachelomonas similis StokesxTrachelomonas synleyensis PlayfairxTrachelomonas synleyensis SvirenkoxTrachelomonas synleyensis SvirenkoxTrachelomonas sp.1xTrachelomonas sp.3x			X	X
Strombomonas lanceolata (Playfair) DeflandrexStrombomonas verrucosa (Daday) DeflandrexStrombomonas sp.xTrachelomonas abrupta SvirenkoxTrachelomonas armata (Ehrenberg) F. SteinxTrachelomonas armata var .gordeievii SkvortzovxXxTrachelomonas hispida varcrenulatocollis (Maskel) LemmermannxTrachelomonas bispida varcrenulatocollis (Maskel) LemmermannxTrachelomonas bispida vartrenulatocollis (Maskel) LemmermannxTrachelomonas pisciformis PrescottxTrachelomonas similis StokesxTrachelomonas similis StokesxTrachelomonas syndreyensis PlayfairxTrachelomonas syndreyensis SvirenkoxTrachelomonas sp.1xTrachelomonas sp.2xTrachelomonas sp.3x		X		
Strombomonas verrucosa (Daday) DeflandrexStrombomonas sp.xTrachelomonas abrupta SvirenkoxTrachelomonas armata (Ehrenberg) F. SteinxTrachelomonas armata var .gordeievii SkvortzovxXxTrachelomonas armata var .gordeievii SkvortzovxXxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxTrachelomonas oblonga LemmermannxTrachelomonas pisciformis PrescottxTrachelomonas similis StokesxTrachelomonas syndreyensis PlayfairxTrachelomonas volvocinopsis SvirenkoxTrachelomonas sp.1xTrachelomonas sp.2xTrachelomonas sp.3x				
Strombomonas sp.xTrachelomonas abrupta SvirenkoxTrachelomonas armata (Ehrenberg) F. SteinxTrachelomonas armata var. gordeievii SkvortzovxXxTrachelomonas armata var. gordeievii SkvortzovxXxTrachelomonas bernardinensis VischerxTrachelomonas bernardinensis VischerxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxTrachelomonas hispida var. hispida (Perty)SteinxXxTrachelomonas pisciformis PrescottxTrachelomonas similis StokesxTrachelomonas sydneyensis PlayfairxTrachelomonas volvocina EhrenbergxXxTrachelomonas sp.1xTrachelomonas sp.2xTrachelomonas sp.3x				
Trachelomonas abrupta SvirenkoxxTrachelomonas armata (Ehrenberg) F. SteinxxTrachelomonas armata var .gordeievii SkvortzovxxTrachelomonas armata var .gordeievii SkvortzovxxTrachelomonas bernardinensis VischerxxTrachelomonas bispida var. crenulatocollis (Maskel) LemmermannxxTrachelomonas hispida var. hispida (Perty)SteinxxTrachelomonas oblonga LemmermannxxTrachelomonas pisciformis PrescottxxTrachelomonas similis StokesxxTrachelomonas sydneyensis PlayfairxxTrachelomonas sydneyensis SvirenkoxxTrachelomonas sp.1xxTrachelomonas sp.3xx				
Trachelomonas armata (Ehrenberg) F. SteinxxTrachelomonas armata var.gordeievii SkvortzovxxTrachelomonas bernardinensis VischerxxTrachelomonas bernardinensis VischerxxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxxTrachelomonas hispida var. hispida (Perty)SteinxxTrachelomonas oblonga LemmermannxxTrachelomonas oblonga LemmermannxxTrachelomonas sinilis StokesxxTrachelomonas sinilis StokesxxTrachelomonas sydneyensis PlayfairxxTrachelomonas sydvocina EhrenbergxxTrachelomonas sp.1xxTrachelomonas sp.3xx		v		Λ
Trachelomonas armata var.gordeievii SkvortzovxxTrachelomonas bernardinensis VischerxxTrachelomonas hispida var. crenulatocollis (Maskel) LemmermannxxTrachelomonas hispida var. hispida (Perty)SteinxxxTrachelomonas oblonga LemmermannxxxTrachelomonas oblonga LemmermannxxxTrachelomonas oblonga LemmermannxxxTrachelomonas sinilis StokesxxxTrachelomonas sinilis StokesxxxTrachelomonas sydneyensis PlayfairxxxTrachelomonas sydnocina EhrenbergxxxTrachelomonas sp.1xxxTrachelomonas sp.3xxx	Trachelomonas armata (Ehrenberg) F. Stein			x
Trachelomonas bernardinensis VischerxxTrachelomonas hispida var. crenulatocollis (Maskel) Lemmermannx				
Trachelomonas hispida var. crenulatocollis (Maskel) LemmermannxxxTrachelomonas hispida var. hispida (Perty)SteinxxxTrachelomonas oblonga LemmermannxxxTrachelomonas pisciformis PrescottxxxTrachelomonas similis StokesxxxTrachelomonas sydneyensis PlayfairxxxTrachelomonas volvocina EhrenbergxxxTrachelomonas sp.1xxxTrachelomonas sp.2xxxTrachelomonas sp.3xxx			x	
Trachelomonas hispida var. hispida (Perty SteinxxxxTrachelomonas oblonga Lemmermannx		x		
Trachelomonas oblonga LemmermannxImage: constraint of the systemTrachelomonas pisciformis PrescottxxTrachelomonas similis StokesxxTrachelomonas sydneyensis PlayfairxxTrachelomonas sydneyensis PlayfairxxTrachelomonas volvocinopsis SvirenkoxxTrachelomonas sp.1xxTrachelomonas sp.2xxTrachelomonas sp.3xx			x	x
Trachelomonas pisciformis PrescottxxTrachelomonas similis StokesxxTrachelomonas sydneyensis PlayfairxxTrachelomonas volvocina EhrenbergxxTrachelomonas volvocinopsis SvirenkoxxTrachelomonas sp.1xxTrachelomonas sp.2xxTrachelomonas sp.3xx				
Trachelomonas similis StokesxxTrachelomonas sydneyensis PlayfairxTrachelomonas volvocina EhrenbergxxTrachelomonas volvocinopsis SvirenkoxTrachelomonas sp.1xTrachelomonas sp.2xxTrachelomonas sp.3x			х	
Trachelomonas volvocina EhrenbergxxTrachelomonas volvocinopsis SvirenkoxTrachelomonas sp.1xTrachelomonas sp.2xTrachelomonas sp.3x	Trachelomonas similis Stokes			х
Trachelomonas volvocinopsis Svirenko x Trachelomonas sp.1 x Trachelomonas sp.2 x Trachelomonas sp.3 x	Trachelomonas sydneyensis Playfair	х		
Trachelomonas sp.1 x Trachelomonas sp.2 x Trachelomonas sp.3 x		x		x
Trachelomonas sp.2 x Trachelomonas sp.3 x			x	
Trachelomonas sp.3 x			x	
				х
Total = 114 39 48 77				
		20		

The proliferation of Chlorophyta in these nutrient rich media is in agreement with the observations of Beman *et al.* (2005) that the availability of nutrients is an essential factor for the proliferation of Chlorophyta. Alkaline pH favors the development of many Desmids (Da, 2007). Concerning the number of taxa per station (figure 3), we observe that Zatta is the richest with 77 taxa listed. The high taxonomic richness of this station is explained by the fact that the richness in nutrients would favor the proliferation of microalgae.

REFERENCES

- Anader. 2006. Monographie du département de Yamoussoukro. Côte-d'Ivoire, 55p.
- Beman J.M., Arrigo K.R., Matson P.A. 2005. Agricultural runoff fuels large phytoplankton blooms in vulnerable areas of the ocean. *Nature*, 434 : 211-214.
- Ben Abou M., Fadil F., El Hadji M. 2014. Evaluation de la qualité des cours d'eau de la ville de Taza utilisés dans l'irrigation des cultures maraichères (Maroc). *Journal of Applied Biosciences*. 77: 6462-6473.
- Brou Y.T., Akindès F., Bigot S. 2005. La variabilité climatique en Côte-d'Ivoire : entre perceptions sociales et réponses agricoles. *Cahiers Agricultures*, 14 (6):533-540.
- Da K.P. 2007. Etude taxinomique du phytoplancton dulçaquicole des masses d'eaux lentiques et lotiques de quelques sites au Sud de la Côte d'Ivoire, entre les fleuves Bandama et Bia: apports de la microscopie électronique à balayage. Thèse de Doctorat d'Etat, Université de Cocody-Abidjan, Côte d'Ivoire, 402 p.
- Dodds W.K., Bouska W.W., Eitzmann J.L., Pilger T.J., Pitts K.L., Riley A.J., Schloesser J.T., Thornbrugh D.J. 2009. Eutrophication of U.S. freshwaters: analysis of potential economic damages. *Environmental Science and Technology*, 43(1): 12-19.
- Fonseca B.M., De Mendonça-Galvao L., Padovesi-Fonseca C., De Abreu L.M., Fernandes A.C.M. 2014. Nutrient beselines of cerrado low-order streams: comparing natural and impacted sites incentral Brazil. *Environ. Monit. Assess.*, 186: 19-33.
- Kollia C. 1998. Influence réciproque de la qualité des eaux naturelles et de la présentation des végétations aquatiques. Mémoire de fin de cycle – génie alimentaire.

- Kim J.T., Boo S.M. 1998. Morphology, population size, and environmental factors of two morphotypes in *Euglena* geniculate (Euglenophyceae) in Korea. Archivfür Hydrobiologie, Supplement, 126: 27-36.
- Koné N., N'Da A.S., Kien K.B., Boguhé G.F.H., Berté S. 2022. Caractérisation physico-chimique des eaux du lac du barrage hydroélectrique de Kossou, fleuve Bandama, Côted'Ivoire. *Rev. Iv. Sci. Tech.* 39 : 55-69.
- Lemoalle J. 1999. La diversité des milieux aquatiques, Les poissons des eaux continentales Africaines : diversité, écologie, utilisation par l'homme. IRD, Paris : 11-30.
- Lwamba B.J., Katim M.A., Kiwaya A.T., Ipungu L.R., Nyongombe U.N. 2015. Variations de la température de l'eau des étangs en période froide à Lubumbashi (R. D. Congo) et implications pour la production des poissons. J. Appl. Biosc., 90: 8429-8437.
- N'Guessan K.A. 2017. Gestion intégrée de l'hydro-système lacustre urbain de la commune de Yamoussoukro: Caractérisation de la pollution anthropique et approche de restauration. Thèse de doctorat, Université Nangui Abrogoua, Côte-d'Ivoire, 159 p.
- Nouayti N., Khattach D., Hilali M. 2015. -Evaluation de la qualité physico-chimique des eaux souterraines des nappes du Jurassique de haut bassin de Ziz (Haut Atlas central, Maroc), *Journal Environnement Science*. 6 (4) : 1068-1081.
- Ouattara A. 2000. Premières données systématiques et écologiques du phytoplancton du lac d'Ayamé (Côte d'Ivoire). Thèse de doctorat, Leuven University, Belgique, 226 p.
- Sanogo S., Kabre T.J.A., Cecchi P. 2014. Inventaire et distribution spatio-temporelle des macroinvertébrés bioindicateurs de trois plans d'eau du bassin de la Volta au Burkina Faso. Int. J. Biol. Ch. Sci., 8: 1005-1029.
- Silva D.M.L., Camargo P. B., McDowell W.H., Vieira I., Salomão M.S.M.B., Martinelli L. 2012. Influence of land use changes on water chemirstry in streams in the state of Sao Paulo, southeast Brazil. Anais da Academia Brasileira de ciencias, 84 (4): 919-930.
- Thomas S.M., Neill C., Deegan L.A., Krusche A.V., Ballester M.V.R., Victoria R.L. 2004. Influences of land use and stream size on particulate and dissolved materials in a small Amazonian stream network. *Biogeochemistry*, 68: 135-151.
