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Preliminary investigation of phytoplankton composition of Ibeno River, Ibeno, Akwa Ibom state, Nigeria

Abstract

Ibeno estuary is a mangrove belt which occupies a larger part of the Atlantic waistline of more than 129km and this study was carried out in a period of 4months to identify the phytoplankton (which are the bases of the aquatic food web) community. The phytoplankton were sampled using Standard methods. The study showed 52 species of phytoplankton belonging to 4 division. The result obtained followed regular pattern as reported for water bodies and falls within acceptable data of highly productive.

Keywords: analysis, akwa, phytoplankton composition, Ibeno river

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Introduction

Phytoplankton are autotrophic (self-feeding) components of the aquatic plant community and a key part of Ocean freshwater.[1] Phytoplankton came from the greek word (phyton) meaning "plant" and plankton meaning "wander' or "drifter". It therefore means in literal term, phytoplankton are plants that wander or are drifted by water current. They form the base of marine and freshwater food webs and are key players in the global carbon cycle.[2] Marine phytoplankton algae are terms used in referring to tiny aquatic plants, appearing as unicellular, colonial or filamentous forms which have no opposition to water currents and are usually drifty or hanging in the open water.[1]

Phytoplankton conserve as toxins or medicine for their consumers, depending upon the identity of their parasite. According to Zaccaroni and Scaravelli (2008), toxins are produced by two algal group, dinoflagellates and diatoms representing 2% of known phytoplankton species (60-80 species out of 3400-4000) and can reach human directly (via consumption). Most toxins are neurotoxins with stable temperature that cannot be ameliorated by working.

Phytoplanktons are also vital water quality indicators due to their short life cycles, and ability to respond to environmental changes, hence their standing crop and species composition reflects the quality heath.[3] They constitute the starting point of energy transfer and are highly sensitive to allochthonously imposed changes to the environment Khattak et al., Microalgae can be feasibly measured irrespective of their microscopic nature. They are regarded as a relevant ecological tool in freshwater analysis and their distribution has a great deal of impact on the health of any water body Denise et al., Ibeno river is one of the water bodies in Akwa Ibom state of Nigeria providing nursery and breeding grounds for fish species and other aquatic fauna. The river has great potential for fish / seafood sales, tourist attraction and aesthetic values. The estuary is one of the richest in land fisheries resources in Nigeria contributing one of the highest quotas of fish production of 90% Nigeria's total marine / brackish water output comes from this estuary.

Material and methods

Study location

The study was carried out at Ibeno town situated on the eastern side of the kwa ibo river about 3km from the river month, and is one of the largest fishing settlements on the Nigeria west, lying in the mangrove forest belt of the Niger Delta region of Nigeria. It is bounded in the West Eastern Obolo Local Government Area, to the north by Onna, Esit Eket and Eket to the south by the Atlantic Ocean (Nigeria fisheries and aquaculture department, 2011). Ibeno occupies the largest Atlantic coastline of more than 129km in Akwa Ibom State and has regular rain fall almost throughout the year with the peak between May and September. The Ibeno shore line marine water is mostly as a result of the high sediments loads of fine mineral, particles absorbing light in the blue range of the spectrum which causes the water to be brownish. The very dark brown coloration of the Ibeno near column marine can be attributed to the dark color of putrefactive effective of decaying / decayed tropical floral / fauna that often inundates most of the streams and riverside area, which finally drains into the near shore water of Ibeno Essien et al.

Phytoplankton identification

Phytoplankton identification and enumeration were done in laboratory. Five drops of each concentrated sample (10ml) were examined x 400 magnifications after mounting on a glass slide and covering with a cover slip each time. Thorough investigation was the carried out, observing all fields within the cover slip border using an Olympus universal wide field research compound microscope, the average of 5 mounts was then taken. Since each drop amounted to 0.1 ml the results on density of species (i.e averages) were multiplied by 10 to give values as numbers of cell per ml. appropriate text such as Sahoo and Seckbach, Prescott, Bellinger and Sigee, Prescott and Cox were used for identification.

Results

Phytoplankton Community Composition

A total number of 52 taxa belonging to 4 divisions Table 1 namely, Bacillariophyta (Diatoms), Chlorophyta (green algae), Cyanophta (Blue-green algae / Cyanobacteria) and Eulenophyta (Euglenoid) were identified from the phytoplankton samples examined. The phytoplankton taxa were mainly of the division Bacillariophyta, which accounted for 84%, 4% and 4% taxa respectively.

Table 1 Phytoplankton Composition and Distribution

S/N	Division / Species
	Cyanophyta
1	*Merismopedia sp.*
2	*Oscillatoria princeps*
	Euglenophyta
1	*Phacus curvicauda*
2	*Phacus pleuronectes*
	Chlorophyta
1	*Closterium monoliferum*
2	*Coleochaete sp.*
3	*Scenedesmus sp.*
4	*Spirogyra sp.*
	Bacillariophyta
1	*Achnanthes sp.*
2	*Amphiprora sp.*
3	*Amphiprora sp.*
4	*Amphora comutata*
5	*Amphora sp.*
6	*Amphora veneta*
7	*Asterionellopsis glacialis*
8	*Asterionellopsis glacialis*
9	*Cocconeis sp.*
10	*Cocconeis sp.*
11	*Cocconeis sp.*
12	*Cyclotella sp.*
13	*Cyclotella sp.*
14	*Cymbella sp.*
15	*Diadesmis confervacea*
16	*Diploneis bombus*
17	*Diploneis sp.*
18	*Encyonema sp.*
19	*Epithemia sorex*
20	*Fragilaria vaucheriae*
21	*Gyrosigma scalproides*
22	*Gyrosigma spencerii*
23	*Mastogloia sp.*
24	*Navicula capitoradiata*
25	*Navicula digitoconvergens*
26	*Navicula margalithi*
27	*Navicula sp.*
28	*Nitzschia intermedia*
29	*Nitzschia nana*
30	*Nitzschia inconspicua*
31	*Nitzschia pellucida*
32	*Nitzschia sigma*
33	*Nitzschia sp.*
34	*Nitzschia sp.*
35	*Pleurosigma sp.*
36	*Rhopalodia sp.*
37	*Rhopalodia sp.*
38	*Rhopalodia sp.*
39	*Rhopalodia sp.*
40	*Rhopalodia sp.*
41	*Rhopalodia gibberula*
42	*Rhopalodia musculus*
43	*Rhopalodia opeculata*
44	*Thalassiosira sp.*

Discussion

Fifty four species belonging to 4 taxonomic groups were recorded in the study area. In this study, results obtained showed fluctuation in species composition throughout the duration of sampling. The phytoplankton composition was dominated by Bacilliarophyta with 44 species and a composition of 84%, chlorophyta; 4 species and 8% while Euglenophyta and cyanophyta had 2 species each with percentage composition of 4% Table 2. The variation in terms of species composition over a period of time is a factor probably due to variation in the level of some important physicochemical parameters prevailing in the Ibeno River. This include water temperature, dissolved oxygen, salricty suspended solids, dissolved inorganic nitrogen. (DIN). This finding is in line with the work of Essien et al, and Kocer and Sen who previously reported similar results as Taxa Baccilariophyta dominating, although Essien's results had a total of 6 divisions present. In another study conducted in a different clime however, Nouwrozi et al.,[4] recorded Chlorophyta to be the most abundant and highest chlorophyll species with (34.46%),due to the adequate and the nature of nutrient supply, basin morphometry, mixing dynamics, watee clarity and alkalinity.[5] Of the 52 species, only 2 species namely *Amphora veneta* and *Epithemia sorex*, from taxa Bacillariophyta were present throughout the entire months of sampling Figure 1. The dominance of bacillariophyta in this study is common to the reports in rivers and creeks of Niger Delta and Nigeria such include Abowei et al. etc.[6–10]

Table 2 Number and percentage and composition of phytoplankton division in Ibeno River

Taxonomic division	Total no of species	Percentage composition
Bacillariophyta	44	84%
Chlorophyta	4	8%
Euglenophyta	2	4%
Cyanophyta	**2**	4%
Total	52	100%

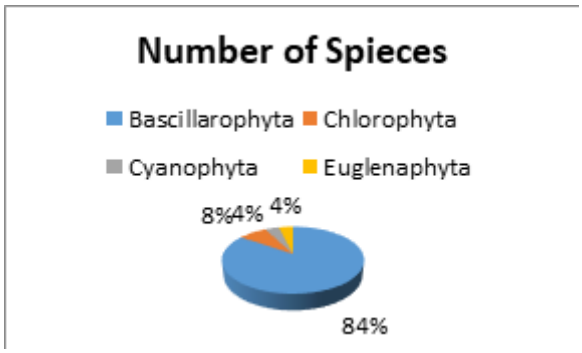

Figure 1 No of species of *Bacillariophyta, Chlorophyta, Cyanophta* and *Eulenophyta.*

Conclusion

52 species belonging to 4 taxonomic groups were recorded in the study area. The phytoplankton composition was dominanted by Bacilliarophyta with 44 species and 84% composition. Only two species; *Amphora veneta* and *Epithemia sorex* were present throughout all the month of sampling.

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None.

Conflicts of interest

The authors declare that there is no conflict of interest.

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