

Biodiversity - 2015: The physicochemical, planktonic and macroinvertebrate analysis of Anya stream in Amaoba town, Ikwuano local government area, Abia State, Nigeria

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Abstract

Water is one of the most important available substances on the earth. The survival of and quality of human life depends on the availability of fresh water. The aquatic animal's life directly or indirectly depends on the water quality status. Water quality study provides current information about suitability of water designated uses. Most of the aquatic ecosystem receives million liters of municipal sewage, industrial and agricultural runoff. Planktonic organisms are important components in the productivity of inland waters. They are distributed among the waters in the bottom (benthic), open water (pellagic) and at the littoral zones (vegetative sides). Planktons are the small and microscopic organisms (phyto and zoo plankton) due to their size, feebleness or immobile nature float or drift at the mercy of water current to maintain a constant position against the water tides. An understanding of their ecology and distribution contribute significantly to the use and management of aquatic ecosystems. Both plankton and macro invertebrates are useful in aquatic food web, with higher trophic levels, such as fish and whales, depending nutritionally on them. They provide a crucial source of food to many large aquatic organisms in both marine and freshwater ecosystem (Lalli and Parsons, 1993). Besides food chain supports in commercial fisheries, plankton ecosystems play a major role in the biogeochemical cycles of many important chemical elements (carbon, oxygen,

nitrogen, phosphorus cycles) (Falkowski, 1994). According to Emiliani (1991), plankton are primarily divided into broad functional (trophic levels) groups. Plankton composition, distribution pattern and succession vary among lakes, streams and rivers, because each aquatic ecosystem has its physio-chemical and biological properties emanated from both the surrounding land mass, geological formation of the water, the local climate, human activities in water and drainage conditions through which run-off is received (White et al., 2008). In addition to its intrinsic biological importance, planktonic organisms are used in the evaluation of the productive capacity of water bodies (Umeham and Ogbonnaya, 1993). Plankton typically flow with water current while some forms are capable of independent movement and can swim hundreds of meters vertical in a single day (diel vertical migration), their horizontal position is determined primarily by the surrounding current, contrary to newton which can swim with the ambient flow and still maintain their position (Aumont and Bopp, 2006).

The role of plankton in aquatic food web and as an indicator of water quality is well known. The availability, distribution, abundance and population of certain community of plankton is an indication of the water quality of an aquatic ecosystem (Case et al., 2008). Water pollution by domestic, industrial and other water users as well as in lock constructions for navigation are the major causes of degradation in

the water quality. However, such studies are still very limited in scope. The aim of the present study is to investigate the species composition as well as abundance of both plankton and macro invertebrates of Anya Stream. It is envisaged that this will make a remarkable contribution to the few existing checklists of the plankton and macro invertebrate composition of Nigerian waters. The physico-chemical also as Macro invertebrate characteristics of Anya stream in Amaoba community, Abia state was studied over a period of 5 months. The stream was investigated in 3 different outlined stations supported degree of human interaction and therefore the plant community along the length of the stream. The result indicated that human interaction influence to an extent the physico-chemical parameter of the water. The phosphate value recorded was between 0.67 ± 0.22 to 0.77 ± 0.18 mg/l. Total hardness ranged between 7.66 ± 0.06 to 20.33 ± 9.16 mg/l while dissolved oxygen recorded 0.73 ± 0.13 to 3.76 ± 0.56 mg/l. The rainfall amount recorded within the amount of study had influence on a number of the parameters. The surface water temperature was lower within the wet months than within the dry ones. The nitrate concentration increased with an increase in the rainfall amount recorded. All parameters assessed apart from the pH and total phosphate fell within the suitable standard of World Health, Organization (WHO), Standard of Nigeria (SON), European Economic Community (EEC), Federal Ministry of Environment (FMENV). There was significant difference within the monthly concentrations of these chemical parameters when subjected to Duncan and LSD analysis. However when the various stations were analyzed, there was no significant difference. A check list of the planktonic abundance and macro invertebrates revealed a total of five zooplankton species, four phytoplankton and six macro invertebrates. The zooplanktons encountered

include Water flea, *Branchionus plicatilis*, *Cyclops* sp., *calanus hyperboreus* and *Moina* sp. The phytoplanktons included the subsequent species *Spirogyra*, *Euglena*, chlorophyte, cyanobacteria while the macroinvertebrates were pond-skater, Dragon flies, Damsel flies, Beetles, Water bugs, immature stages of Mosquitoes (larva, pupa) and the adults respectively. *Chlorophyceae* (*spirogyra*), had the very best cell density of phytoplankton with a percentage of 100.0% obtained from a complete of 184 cells/ml from four broad groups of phytoplankton, based on the result and following standard criteria, the stream might be said to be suitable for domestic, industrial and agricultural uses, however basic treatment can help improve the portability of water especially for drinking.

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