MACROINVERTEBRATE DIVERSITY AND WATER QUALITY PATTERNS OF A MUNICIPAL STREAM IN DOKO DISTRICT, NIGER STATE, NIGERIA

*Umar B.L., Arimoro F.O., Adama S.B., Mohammed Y.M., Mohammed A.Z. & **Auta Y.I.**

Applied Hydrobiology Unit, Department of Animal Biology, Federal University of Technology Minna, Niger State, Nigeria.

*Corresponding author; umarliman90@gmail.com.

Abstract

The macroinvertebrate community of Emikpata stream, Doko district, Niger State, Nigeria were studied for a period of eight months using the modified kick sampling techniques. Four well marked stations were selected along the course of the stream designated as station 1, 2, 3,4.Physicochemical parameters examined and readings were: Water temperature (23.0-27.0°C),Depth (20.96-24.10cm), Flow velocity (0.29-0.30m/s), Dissolved oxygen (5.97-6.35mg/l),Biochemical oxygen demand (3.25-3.87mg/l), pH (6.0-6.32, Conductivity (49.1-110.0µS/cm),Total hardness (12.3-18.0mg/l), Total alkalinity (13.0-20.5mg/l), Chlorine (10.71-32.79mg/l),Nitrate (1.83-3.69mg/l), Phosphate (0.60-1.12mg/L), Sodiumn (7.24-9.02mg/l), Potassium (1.74-1.92mg/l). A total of 625 individuals from 28 species and 19 families of invertebrate were recorded. Significantly higher($P<0.005$) macroinvertebrate abundance was recorded during the dry season as compares to the wet season. The Canonical Correspondence Analysis (CCA)result showed strong relationship between species abundance and measured environmental variables. Higher population of pollution tolerant macroinvertebrates groups and the poor water quality observed during the sampling period were indications of pollution stress occasioned by anthropogenic activities, decomposing domestic wastes and inorganic fertilizer washed into the stream from various nearby farms.

Keywords: Macroinvertebrate, Community, Emikpata Stream, Doko, anthropogenic activities, domestic wastes, fertilizer

Introduction

Macroinvertebrate organisms form significant part of an aquatic ecosystem;they are of ecological and economic importance because they maintain various levels of interaction within aquatic environment (Dobson et al. 2002). Biomonitoring of these organisms may help to conserve and proffer appropriate management decisions in an aquatic ecosystem. Macroinvertebrates have limited mobility and can stay in an area for some time without moving away easily. The type of macroinvertebrates species obtained may be used as indicator of the status of the water quality of that environment at that location in a particular time (Arimoro and Keke, 2017). Macroinvertebrates have high variability and are significant to predict the effect of short-term environmental variation which are used to distinguish some characteristics of rivers and streams across the globe (Barbour et al 1999). Substrate is perhaps one of the

most important factors affecting the distribution of macroinvertebrates, although alterations in physicochemical parameters such as temperature, salinity and food availability also play vital role in determining the extent of distribution and abundance of benthic macroinvertebrates species in aquatic ecosystem. Also, they constitute a major link in the aquatic food chain (Olomukoro et al 2013; Uwem and Edet 2016). Fresh-water