

## ABSTRACT

### RESPONSES OF BENTHIC MACROINVERTEBRATE COMMUNITIES IN STREAMS OF CABUYAO, LAGUNA TO SURROUNDING INDUSTRIAL LAND USE

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Industries are one of the significant sources of pollutants of freshwater ecosystems such as rivers and lakes especially when effluents are disposed untreated. San Cristobal and Diezmo Rivers in Cabuyao, Laguna are freshwater bodies receiving industrial effluents coming from commercial establishments and factories in the area. Despite this, there are only few studies that focus on the effect of industrial effluents in water quality parameters and macrobenthic communities in the river. In this study, effects of industrial land use to spatiotemporal variation of water quality and benthic macroinvertebrate communities were studied. Principal component analysis revealed that variability in water quality was mainly due to pH, temperature, total suspended solids, ammonia-nitrogen, nitrate-nitrogen, phosphate, and dissolved oxygen concentration. Downstream areas have higher concentration of phosphate, ammonia-nitrogen, nitrate-nitrogen, and biochemical oxygen demand concentration, often exceeding DENR Administrative Order (DAO) 2016-08 levels. Dissolved oxygen levels in the downstream areas, except for Diezmo River, were also below DAO 2016-08 limit of 5 mg/L. For the benthic macroinvertebrate communities in the streams studied, a total of 3,446 individual benthos belonging to 44 families were sampled. In the upstream, there were more taxa identified, higher abundance of sampled benthos, and higher diversity index values. Chironomidae and families belonging to Ephemeroptera-Plecoptera-Trichoptera (EPT) taxa were primarily responsible for the observed dissimilarities in the upstream and downstream areas. Chironomidae, a pollution-tolerant taxon, was abundant in the downstream whereas EPT, pollution-sensitive taxa, was abundant in the upstream areas. It was found out that ammonia-nitrogen, nitrate-nitrogen, phosphate, and dissolved oxygen concentration were mainly responsible for assemblage of benthic macroinvertebrates. Canonical correspondence analysis considering only Chironomidae and EPT taxa revealed that ammonia-nitrogen, phosphate and dissolved oxygen concentration were responsible in the observed assemblage. Responses of benthic macroinvertebrates to pollution in this study were reduction of diversity and domination of pollution-tolerant taxa in the downstream area.

**Keywords:** *water quality, benthic macroinvertebrates, industrial effluents, rivers*