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Plankton Diversity of Selected Waterbodies in Relation to Status of Pollution**Kumarasinghe, K.V.D.Y.K.***, Arundathi, B.L.A., Bopitiya, B.V.N.V.P., Anusara, I.,
Amarasinghe, K.P., Rukshan, C., Rupasinghe, R.S., Dayawansa, P.N.*Faculty of Science, University of Colombo, Colombo 03, Sri Lanka***yoshinikumarasinghe@gmail.com***Abstract**

Plankton are valuable bioindicators that can be used to evaluate the quality of waterbodies. This study was carried out to correlate plankton diversity and water quality of three lakes in Colombo: Mattegoda-lake, Rukmale-lake, and Olupattawa-lake affected by different pollutant sources. Volumes of 1L of water from nine locations across the lakes were collected in daytime, filtered through a 33 µm plankton sieve, and preserved with 10% formalin. Concurrently, samples were analysed for physicochemical parameters: Dissolved Oxygen (DO), pH, Electrical Conductivity (EC), turbidity, Total Dissolved Solids (TDS), nitrate, and phosphate to calculate biotic indices to evaluate water quality. Microscopic identification of planktons using rose-bengal stain identified a total of 28 genera of plankton across all lakes, including five genera each of Chlorophyceae (phytoplankton), Bacillariophyceae (phytoplankton), Rotifera (zooplankton); eight of Copepoda (zooplankton); three of Branchiopoda (zooplankton); and one genus each of Cyanophyceae (phytoplankton), Zygnematophyceae (phytoplankton), Euglenophyceae (phytoplankton), and Ciliophora (zooplankton). Bacillariophyceae dominated (~63% of total plankton) in Mattegoda and Olupattawa lakes, whereas Zygnematophyceae dominated in Rukmale-lake. Significant differences in EC and TDS were found among the lakes ($p < 0.05$) through a one-way ANOVA test, with Mattegoda-lake showing the highest average EC (140.0 µS) and Olupattawa-lake the lowest average TDS (47 ppm). Several plankton species identified at Mattegoda-lake such as *Microcystis*, *Pediastrum* sp., *Cyclotella*, *Ankistrodesmus*, *Euglena*, *Eudorina*, *Pinnularia* are known pollution indicators and support its classification for being polluted compared to the other two lakes. This was further supported by Palmer's Algal Genus Pollution Index, which yielded a score of 11 for Mattegoda-lake while neither of the other two lakes received any score. Biodiversity comparisons between zooplankton and phytoplankton revealed no significant differences in Shannon-Wiener diversity ($p = 0.729$) or evenness ($p = 0.510$). The findings highlight the utility of plankton as bioindicators and identify Mattegoda-lake being most impacted due to high-level of EC, a parameter commonly associated with increased ion concentrations due to pollution and the Olupattawa-lake being least affected due to absence of indicator species and having a lower average TDS value. The organic-pollution was caused likely due to past industrial-waste discharge and illegal dumping near Mattegoda-lake, while Olupattawa-lake remains relatively unpolluted due to being in an isolated location.

Keywords: *Plankton, Bioindicators, Water quality, physico-chemical parameters*