Comparative Study on Determination of Water Quality Using Physicochemical Parameters and Benthic Macroinvertibrates of the Sarasavi Oya, University of Peradeniya, Sri Lanka

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Water pollution affects the water quality and the biodiversity of the aquatic community. The present study determines the water quality using benthic macro invertebrates and physicochemical parameters of the Sarasavi Oya, University of Peradeniya, Sri Lanka at three locations (X, Y and Z) of the 400 m stream stretch for a period of three months from March to May in 2019. Physicochemical parameters such as temperature, pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Biological Oxygen Demand (BOD_5), Dissolved Oxygen (DO), nitrates and orthophosphates were measured with three replicates. Macroinvertebrate community were studied along a five meter line transect at the locations. Weighted Arithmetic Water Quality Index (WAWQI) for physicochemical parameters and relative abundance, Shannon-Wiener Index (SWI) and Simpson Index (SI) for biological indicators were calculated. The mean values of temperature, pH, EC, TDS, DO, BOD_5, nitrates and orthophosphates in the Sarasavi Oya were 24.1°C, 6.98, 0.08 mS cm^{-1}, 0.03 g L^{-1}, 5.30 mg L^{-1}, 1.96 mg L^{-1}, 0.43 mg L^{-1}, and 0.04 mg L^{-1}, respectively. However, these values do not exceed the maximum limits of water suitability for aquatic life introduced by Central Environment Authority (CEA). WAWQI (X=8.52, Y=17.42, and Z=23.97) indicate that A-grade water (excellent water quality) is available in the Sarasavi Oya. The macroinvertebrates recorded with the highest relative abundance in X, Y, and Z locations were water strider *(Geris adelaidis*), Water stick insect (*Ranatarafiliformis*) and Fresh water crab (*Paratelphusa sp.*), respectively which indicate the better water quality at X than in Y and Z. SWI (X=2.05, Y=1.84, and Z=1.93) and SI (X=0.14, Y=0.18, and Z=0.16) explains that the highest diversity in sampling locations. SWI has been found with a positive correlation with DO, whereas negative correlation with BOD_5, EC, TDS, nitrates, phosphates and WAWQI. SI has been found with a negative correlation with DO and positive relationship with BOD_5, EC, TDS, nitrates, phosphates and WAWQI. The results also reveal that there is a direct relationship between physicochemical parameters and the macroinvertebrate diversity and the water quality was suitable for healthy growth of macroinvertebrates in the stream.

Keywords: Shannon-Wiener Diversity Index, Simpson Diversity Index