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Impacts of habitat quality variation on ichthyofaunal diversity in upper catchment area of Badulu-oya, Sri Lanka

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Richness of macro and micro habitats is one of the important factors that determine the species richness and species diversity in an aquatic habitat. Badulu-oya, tributary of River Mahaweli is well equipped with diverse habitats ideal for ichthyofauna. Increased anthropogenic activities have been pressured to dilute pristine qualities of the catchment. The study was based on twelve locations along 24 km stretch of the upper catchment of Badulu-oya including four lateral tributaries for eight months period. Ichthyofauna was sampled using medium size seine net, scoop nets and cast net within a 150 m reach in each location as covering 3 types of geomorphic channel units. Epifaunal substrate, embeddedness, pool substrate characterization, velocity/ depth regimes, pool variability, sediment deposition, channel flow status, channel alteration, frequency of riffles, bank stability, vegetative protection, riparian vegetative zone width were considered to assess the habitat quality index (HQI) in each location. A numerical scale of 0 to 20 was assigned for each parameter and ratings were totaled and compared to a reference condition to provide a final habitat ranking. Shannon-Wiener diversity index (H'), Margalef species richness index (Dmg) and Shannon Evenness (E) indexes were calculated for each location. Principle Component Analysis (PCA) was performed in order to identify underline patterns of correlations of habitat quality and Ichthyofaunal diversity indexes in different locations. Scores increase as habitat quality increases indicating high HQI have achieved locations which preserved their pristine nature. Nineteen ichthyofaunal species including five endemics, eleven indigenous and three exotic species which belong to 10 families were observed during the survey. Three Diversity indices were significantly differed ($P < 0.05$) spatially. Highest H' (2.56 ± 0.05), Dmg (2.95 ± 0.11) and E (0.91 ± 0.019) were recorded in relatively pristine locations which earn higher scores for HQI. Five principle components (PC) were obtained with Eigen values > 1 summing almost 76% of the total variance in the data set. The PC 1 and PC 2 represented 24% and of 20 % of the data variability respectively. All most all locations which identified as a pristine correlated with the HQI and percentage cover of shade. HQI, Dmg and H' were positively correlated with the PC 2. Locations with poor environmental quality and high anthropogenic disturbances were negatively correlated with the HQI and diversity indices. Relatively disturbed habitats qualities that received high load of urban discharges and low riparian vegetation recorded lowest diversity indexes. Tributary locations where preserve relatively high habitat qualities while harbour high species diversity. Healthy aquatic ecosystem provides divers habitats for their inhabitants with stress free environment. Therefore it is timely focus on conservation of the pristine conditions of the natural aquatic habitats while sustainably deriving resources from them for the sake of preserve high biodiversity for the future.

Biography

R M G N Rajapaksha has completed her BSc Honors Degree from Rajarata University of Sri Lanka and currently working as a Lecturer in Uva Wellassa University of Sri Lanka attached to Aquatic Resources Technology Degree Program.

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