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Influence of Stream Characteristics on Diversity and Distribution of Benthic Algae in Gongawwaela in Kottewa Rainforest, Galle, Sri Lanka

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Abstract

Influence of stream characteristics on diversity and distribution of benthic algae was studied at four sampling sites located at 1.5km distance in the Gongawwaela stream located in Kottewe rainforest from September to November, 2016. Water quality parameters pH, conductivity, Temperature, Dissolved Oxygen (DO), Total Suspended Solids (TSS), Total Dissolved Solids (TDS) and nitrate and phosphate, were measured. Substrate types were categorized by sieve analysis and grain size distribution curves. pH, conductivity, nitrate, phosphate and % organic matter of soil were measured as its chemical properties. Benthic algae were sampled by Line Transect method. Most important stream characteristics that potentially influence the growth of benthic algae, were identified using Principle Component Analysis (PCA). Nitrate, TDS, temperature, pH, and DO of water and pH, phosphate and nitrate of substrate showed significant temporal variations. Substrate conductivity and water velocity varied significantly among the sampling sites. Species richness of benthic algae (29 genera) showed significant negative correlations with substrate phosphate (R^2=-0.9921, $P<0.05$) and substrate pH (R^2=-0.999, $P<0.05$). Well-graded substrate was observed only at the most downstream site (site 3) while other sites had poorly graded substrata consisting over 90% sand. Bacillariophyta was the most abundant algal division and the abundance of *Flagilaria* sp*., Pinnularia* sp*., Stigeoclonium* sp*.,* and *Pediastrum* sp*.* showed significant temporal variations. *Pinnularia* sp*., Synedra* sp*.*, *Anabaena* sp*.* and *Navicula* sp*.* were possible indicators of the upstream characteristics, while *Cosmarium* sp*., Pinnularia* sp*., Surirella* sp*., Tabellaria* sp*., Synedra* sp*., Closterium* sp*.* and *Navicula* sp*.* were possible indicators of the downstream characteristics. PCA showed that DO, conductivity, TSS, pH, nitrate and discharge of water, and conductivity, nitrate, phosphate, % organic matter, pH, and % canopy cover of the substrate influence the growth of benthic algae.

Key words: *benthic algae, rainforest, stream characteristics, water quality, water discharge.*

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