

## Identification of Macrophyte Indicator Species to Evaluate the Water Quality in Diyawannawa Wetland.

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### Abstract

Present study was conducted to assess the spatial variation of macrophyte distribution and water quality parameters of a rehabilitated and non-rehabilitated areas of the Diyawannawa wetland with the aim of identifying suitable macrophyte indicator species for water quality monitoring. Sites A, B and C were located in non-rehabilitated area and the sites D, E and F were located in rehabilitated areas in Diyawannawa wetland. The sampling was conducted from April to October 2016. At each site, water pH, temperature, conductivity, salinity, total dissolved solids (TDS), dissolved oxygen concentration (DO), biological oxygen demand (BOD<sub>5</sub>), chemical oxygen demand (COD), depth, visibility, total nitrate (TN), chlorophyll a (Chl a) and total phosphorus (TP) concentration were measured and the percentage cover of macrophytes were recorded. The correlation of percentage cover of macrophyte species to the water quality parameters were assessed using Pearson's correlation analysis. Principal component Analysis (PCA) based on the percentage cover of macrophyte species was performed to identify the characteristic species at each site. MINITAB 14 software was used for statistical analysis of data. The percentage cover of *Hydrilla verticillata*, *Pistia stratiotes* and *Cyperus iria* did not show significant spatial variations among rehabilitated and non-rehabilitated areas. Significantly high percentage cover of *Nymphaea ampla* (64%) and *Annona glabra* (11%) were recorded in site A in non-rehabilitated area. *Eichhornia crassipes* (22%) showed significantly high percentage cover in site B in non-rehabilitated area and site E in rehabilitated area. *Cryptocoryne wendtii* recorded significantly high percentage cover in sites A (10%) and E (7%). The highest mean percentage cover of *Salvinia molesta* (30%) were recorded in site E. The spatial variation of physico chemical parameters indicated significantly high DO in sites E (10.61 mg/l) and F (10.28 mg/l). Significantly high Chl a concentrations were recorded from sites B, E and F. In addition, site F recorded significantly high BOD<sub>5</sub> (6.56 mg/l), TN (0.04 mg/l) and COD (454.8 mg/l). There was no significant spatial variation of TP among sampling sites. *S. molesta* and *E. crassipes* showed positive correlations with Chl a and TP and *N. rubra* showed a positive correlation with TN. *H. verticillata* and *P. stratiotes* did not show significant correlations with water quality parameters. According to PCA, considering PC scores 1 to 3, site A in the non-rehabilitated area was characterized by *N. ampla* and *C. wendtii*, site B by *E. crassipes* and *P. stratiotes* and site C by *A. glabra*. In rehabilitated area, site D was characterized by *C. iria* and *Ceratophyllum demersum*, site E by *S. molesta* and site F by *N. rubra*. The PCA based on water quality parameters grouped the sites E and F together and were characterized by high TN and Chl a concentrations. The results of the present study indicated that there is significant spatial variation of percentage macrophyte cover in relation to water quality parameters. Further, this study identified *S. molesta* and *Eichhornia crassipes* and *N. rubra* as suitable indicator species of Chl a and TP and TN in wetland health monitoring studies.

**Keywords:** Percentage cover, Rehabilitated wetlands, Principal component Analysis, Bioindicators, Sri Lanka