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Influencing Factors and Mechanism for Morphological Alterations of *Aponogeton crispus* and Their Genetic Comparison at the Dediyaigala Stream, Sri Lanka**Chandrasiri K.S.U.¹, Atapaththu K.S.S.^{1*}, Asanthi H.B.¹, Samradivakara S.²,
Hirimuthugoda N.Y.³**¹*Department of Limnology and Water Technology, Faculty of Fisheries and Marine Sciences & Technology, University of Ruhuna, Matara, Sri Lanka*²*Department of Plant, Soil and Microbial, Michigan State University, United States*³*Department of Animal Science, Faculty of Agriculture, University of Ruhuna, Matara, Sri Lanka***keerthi@fish.ruh.ac.lk***Abstract**

Streams are one of the main aquatic ecosystems which have a connectivity from head waters to oceans. Along this longitudinal gradient, streams exhibit huge faunal and floral diversity. Despite the well-observed variations within the same floral species along the streams; information on factors behind such variations is scarce to our knowledge. Thus, the present study was designed to study the factors behind the observed morphological variations in *Aponogeton crispus* (Kekatiya in Sinhala) found in the Dediyaigala stream located in Matara district. Five study sites were selected along a segment (~2 km) of the stream. For each site, plant density was detected in randomly selected quadrates (50×50 cm²) and plants were sampled for the subsequent morphological, anatomical, biochemical and genetic analysis. Physicochemical properties such as pH, temperature, and dissolved oxygen content, water flow velocity and conductivity of water were measured onsite while nutrients (NO₃⁻ and PO₄³⁻ concentration in water and soil) was measured at the laboratory. Sediment core samples were brought to detect organic matter content and the particle size distribution. Molecular identification of selected plant samples was performed by DNA barcoding. Morphological variations such as length, width folds of plant leaves were observed and they significantly correlated to the abiotic factors including velocity, plant density, particle size, soil nitrate, water nitrate, dissolved oxygen, pH, and total suspended solids. However, irrespective of the observed morphological variations in the selected plants, the molecular composition of the DNA barcoding regions namely, MatK and psbA-trnH of the selected plants were found to be the same as wild type plant *Apanogetton crispus*. This was further confirmed by the phylogenetic tree analysis. Therefore, this study revealed that the morphological variations in *Aponogeton crispus* can be attributed to the function of abiotic factors. Together with these findings further studies on other factors that may influence the morphology variance and DNA barcode for another primers could assist better understanding and management of aquatic ecosystem.

Keywords: *Aponogeton crispus*, Morphology, DNA barcoding, Aquatic macrophytes