

RELATIONSHIP BETWEEN AMBIENT AIR POLLUTION AND LICHEN DIVERSITY IN URBAN, SEMI-URBAN AND UNDISTURBED LANDSCAPES IN GALLE

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Abstract

Air pollution has become a global issue and it is not restricted by land boundaries since air pollutants move rapidly depending on the weather condition. Vehicle emissions, industrial emissions and urbanization etc. are known to be the main contributing factors for the air pollution. Air quality monitoring is essential for assessing the air pollution levels in urban, sub-urban and also in rural areas. Development of indirect indicators for air quality is one way to assessing air pollution levels in an area. Therefore the objective of this study is to evaluate air pollutant levels and lichen species composition in selected urban, semi urban and rural areas in Galle to developed indirect indicator.

In this research, ambient NO₂ and SO₂ concentrations were measured by using passive air sampling techniques in selected locations in Galle representing rural, sub-urban and urban areas. In parallel to air sampling, lichen sampling was conducted at each location as lichens are considered as good indirect bio indicators of air pollution. The levels of air pollutants and lichen species composition in each category was analysed using univariate and multivariate statistical approaches. Results of the study indicated that rural areas having significantly low concentrations of air pollutants while both urban and sub-urban areas having high concentrations of SO₂ and NO₂. The highest air pollution was recorded at Karapitiya area which came under sub-urban category, possibly related to high level of vehicle movement within the area. Analysis of lichen species indicated some lichen species are more vulnerable to air pollution while some species such as *Graphis* sp., *Cryptothecia* sp., *Pyxinecoco*es and *Pyxinesp* are tolerant to the air pollution. Atmospheric Purity Index was calculated by using lichen diversity in rural, sub urban and urban categories indicated a negative correlation with the air pollution. The study revealed that increasing tendencies of air pollutants and changes of community composition of lichen species along a gradient of urban, semi-urban and undisturbed landscapes in Galle.

Keywords: Ambient Air Pollution, Atmospheric Purity Index, Lichen Diversity, Nitrogen Dioxide, Sulfur Dioxide