

## LICHEN DIVERSITY AND TAXONOMY IN FOREST DIE-BACK AREAS IN HORTON PLAINS NATIONAL PARK, SRI LANKA AS BIOMONITORS OF ECOSYSTEM HEALTH

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Lichens are useful in different ways and play a major role in the water and in nutrient cycles in some ecosystems. They act as pioneers of vegetation colonization and are consumed by some vertebrates, birds and insects. Lichens produce a wide range of unique secondary metabolites, which are being examined for new pharmaceuticals, agrochemicals, enzymes for use as biosensors, biotransformation reactions and diagnostic kits and as environmental indicators for pollution monitoring processes and for biomonitoring. Between 2006 to 2008, the distribution of lichens in the forest areas in the Horton Plains National Park (HPNP) was surveyed to determine the forest ecosystem health based on ecological continuity, using lichen diversity, composition and frequency, while providing taxonomic descriptions. Study sites were selected from a remote sensed map of HPNP. Study sites (50 m × 20 m transect) were selected randomly. Phorophytes above  $\geq 5$  cm dbh were accounted and for each tree, height, diameter and the surrounding light intensity were measured. Lichens were collected from these Phorophytes (only up to 1.5 m) for identification. In 0.8 ha of the die-back forest studied, 69 lichen species (35 crustose, 31 foliose, 3 fruticose) encountered. These lichen species represented 38 genera and 21 families. Two die-back forest types were recognized in the study area based on presence or absence of *Strobilanthes*. Trebouxian photobionts, which prefer dry conditions, were most common type followed by shade-loving Trentepohlian lichens. Cyanolichens that favored wet shady conditions were found in both die-back forest types. More lichen species were recorded in *Strobilanthes* free die-back sites than in die-back forests frequented by *Strobilanthes* plants. *Strobilanthes* stands create wet conditions enhancing the growth of bryophytes and increase foliose lichens, including cyano-lichens. Consequently, the number of crustose lichen species decreased due to reduction of the exposed bark area on tree trunks. Changes in *Strobilanthes* stands influence lichen growth and diversity. Two of the four clusters recognized in the cluster analysis, represented later stages of die-back with *Strobilanthes* plants; the remaining two included *Strobilanthes* free regenerating forest stands, comprising young and mature host plants. The higher ecological index of macro-lichen genera in die-back forest highlighted the stability of the *Strobilanthes* free forest and indicated that its ecological continuity is highly preserved. Cluster analysis using frequency and cover values of Ecological Continuity Indicator lichen genera showed that the difference between two die-back forests types studied may be due to the higher ecological disturbances, which may have occurred in the *Strobilanthes* forest.