

Section 2

Executive Summary of the Project:

Although lichens are a conspicuous component of many tropical environments, the taxonomy and description of these are little studied. In the tropics, environmental techniques using lichens are less developed, owing to a lack of knowledge of the taxonomy and the ecology of the organisms. In Sri Lanka, there is a paucity of knowledge of its lichen flora. Hence, an essential part of the current project was to produce baseline taxonomic data.

Prior to this study, taxonomic work on lichens of Sri Lanka had been conducted entirely by overseas scientist commencing in 1849 and leading to the Hale's collection (1976-1978). These studies have documented 659 species in 122 genera. Information on their natural history is completely lacking and only a few specimens have been deposited in Sri Lanka. In the present study, lichens from 18 sampling sites within continuous forest and forest islands were selected using remote sensing map of Horton Plains National Park (HPNP). Types of lichens and their diversity in relation to light intensity, temperature, tree species, density, height, diameter and the distribution pattern of trees within the transect were recorded. At the same time air quality monitoring in the HPNP was carried out to determine the lichen species sensitivity to the disturbance or air pollution in HPNP.

A total 379 lichen species belonging to 67 genera and 24 families were identified. This study documented several new lichen taxa for Sri Lanka that consist of 12 genera and 102 species. The 12 new genera were composed of 7 foliuses (*Fuscopannaria*, *Leioderma*, *Anzia*, *Canomaculina*, *Cetrelia*, *Canoparmelia*, *Menegazzia*), 4 crustoses (*Punctelia*, *Pleurotrema*, *Parathelium*, *Pleurotheliopsis*) and 01 fruticose (*Polichidium*) lichen genera. Similarly the 102 species were composed of 11 species of crustose, 89 species of foliose and 03 species of fruticose. A principal co-ordinate analysis (PCA) of site data, tree data and lichen cover shows that most of the lichens are highly correlated with the bark pH and light demanding crustoses such as Thelotremataceae, Pyrenulaceae are positively correlated with the high light intensities. Most of the lichens present in the study plots preferred relatively high pH range (5.0-6.0). The most dominant lichen species (314 species) within this pH range were macrolichens like *Lobaria retigera*, *Pseudocyphellaria beccarii*, *Heterodermia microphylla* and microlichens like *Graphis sp.* *Myriotrema sp.* like microlichens. The number of lichen colonies increase with increase diameter class from 5-10 cm to 11-20 cm. The highest number of lichen colonies was found on hosts of 11-20 cm diameter class in both forest types. It was clearly observed that the number of lichen colonies decrease with increasing diameter size of the lichen host species. According to the observations smooth bark type had the highest diversity of lichens in both forest types and this was followed by smooth to rough bark type. The least lichen diversity was observed on deeply furrowed bark type in the continuous forest, while in the forest islands, the least diversity was observed on flaky bark type.

The data revealed that the concentrations of ambient NO₂ and SO₂ were very low in HPNP. The variations of ambient NO₂ and SO₂ concentration during the study period showed insignificant positive correlation ($p \geq 0.05$) with the rainfall pattern. Considering the variations of two pollutants with RH and number of vehicles visited HPNP, both pollutants had insignificant positive correlation. The IAP value obtained for the whole area of the HPNP was 54.22. This value belonged to the quality level 5 which represent the 'very low' pollution level (Kommission Reinhaltung der Luft in VDI and DIN, 1995). The results

including lichen data and air quality data could confirm that the ambient air quality at HPNP is very high.