

IBD2019

International Conference on

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Adamski & Malikul

May 22 (Wed) – 24 (Fri), 2019

**Centara Grand & Bangkok Convention Centre at CentralWorld
Bangkok, Thailand**



INTERNATIONAL CONFERENCE ON BIODIVERSITY
BIODIVERSITY FOR SUSTAINABLE BIOECONOMY



The influence of microclimate on biodiversity of lichens in the tropical forests at Khao Yai National Park, Thailand

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ABSTRACT:

Lichens are epiphyte making up of fungus and/or algae, cyanobacteria in mutualistic association. They depend on resources for living from the atmosphere. As such, they are sensitive to climatic condition, and require relatively specific environment. Understanding lichen microhabitat leads to conservation and sustainable utilization of this unique bio-resource. The objectives of this work were to monitor microclimate of lichen habitats, and lichen communities along tree trunks from bases, mid trunks and canopies in five ecosystems at Khao yai National park. Microclimates were recorded and lichens were observed in quadrates on three levels of tree trunks during 2010-2015.

Light intensity play major role influencing microclimate of lichen habitats in the five forests. The highest average light intensity and subsequently lower, measured at the tree bases and the canopies, were recorded from the Dry Dipterocarp Forest (DDF), the Secondary Forest (SF), the Tropical Rain Forest (TRF), the Dry Evergreen Forest (DEF) and the Lower Montane Forest (LMF) ranging from 256-3 $\mu\text{mol m}^{-2}\text{s}^{-1}$. The highest average temperature showed parallel pattern with light intensity ranged from 27.3-19.4 °C. Whilst, the highest average relative humidity had inverse pattern with those of light and temperature measured 87-64%.

A total of 115 lichen taxa were observed from these trees in the five forests. A single tree in the TRF hosted the richest taxa of lichens known as many as 43 species, and subsequently lesser in the DEF, SF, DDF, and LMF recognized for 26, 22, 15 and 14 species, respectively. Each taxa occupied specific microhabitats along tree heights and forests. The dominant species in the five forests included *Anisomeridium* sp. and *Chapsa asteliae* (TRF), Sterile soredia 2 (DEF), *Parmotrema tinctorum* (DDF), *Dichosporidium brunthaleri* (LMF) and *Lecanora leproplaca* (SF). The canopies of all forests accommodated the richest diversity of lichens, except the SF where the highest taxa was noted from the mid trunk level. However, the DEF and DDF showed the highest similarity, whilst all lichens in the LMF were entirely different from the other ecosystems. Only *Dirinaria applanata*, *Graphidastra multiformis*, *Parmotrema tinctorum*, *Pertusaria velata* and *Platygramme caesiopruinosa* inhabited more than one habitat indicating that these lichens had adaptive capacities to live in diverse environment. Lastly and more importantly, biodiversity of lichen in Thailand needs long term intensive investigation to enhance our understanding on this bio-resource for conservation and sustainable utilization in the present environmental degradation.

KEYWORDS:

Epiphyte; microhabitat; tree trunk; canopy; dominant species