

Title: Diversity, ecology and altitudinal distribution of corticolous lichens in Mount Kenya Tropical Montane Forest

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Abstract: While recent studies indicate a high diversity of lichens in the tropical regions of the world equaling or even surpassing that of temperate areas, studies of lichens in these regions remain rare and Kenya is no exception. The aim of this study was to enhance our knowledge of lichen diversity in Mt. Kenya forest. Diversity, composition and altitudinal distribution of corticolous lichens was evaluated in Chogoria a wet forest type and Sirimon a dry upland forest. At every 200m elevation starting from the lower forest edge plots measuring 10 x 200m were established, these were further subdivided into 10 x 20m subplots from which two host trees were randomly selected for sampling. Ten sites were studied, six in Chogoria and four in Sirimon using stratified random sampling method. Four ladder quadrats measuring 10x 50 cm were placed on the tree trunks 1.5m from the ground on the four compass directions and all lichens occurring inside these quadrats collected. In total 113 host trees of 13 species were sampled, Chogoria recorded higher diversity of host trees than Sirimon. A total of 245 taxa were recorded from 1007 specimens collected, these were classified into 73 genera and 38 families. Sixteen species were new for Africa while seventy three were first records for Kenya, seven new species were discovered. Majority of taxa in the dataset were rare, recorded only once or twice in the samples. Chogoria forest had higher species richness (150) than Sirimon (91). Rarefaction curves were used to compare species richness and abundance in the two forest areas and among study sites. Eight non parametric species estimators were used to approximate the number of species expected from each forest. Sampling effort computed revealed adequate sampling with 67% completeness. To test for differences in lichen assemblages among study sites, MRPP was used while ordination of study sites was performed using NMS. Altitude and vegetation type had a significant influence on lichen richness, abundance and occurrence. Chogoria recorded high abundance of crustose micolichens at lower elevation whereas at higher altitudes macro lichens were more abundant. Beta diversity was high for the two forest areas as well as among the study sites indicating high heterogeneity. Subtle lichen preference for the tree host species was revealed through 1SA. Overall high family, generic and species diversities were observed. Lichen identification was done using morphological and anatomical characters of lichen thalli, apothecia and ascospores in addition to chemistry. Presence of chemical substances on lichen thalli was detected by spotting reagents that give characteristic colour changes and by exposure to UV light to detect substances that fluoresce under UV light giving characteristic colours. Standardized TLC was performed in identification of specific lichen substances. To enable biomonitoring and comparative studies more lichen biodiversity research covering other montane ecosystems is recommended. Lichen metabolites and their derivatives have great potential use in pharmaceutical and agrochemical industries, more research to determine their use in medicine and crop protection is therefore strongly recommended.

