SUMMARY

The work presented in the dissertation entitled “Studies on Moss flora of Nilgiri hills (Tamil Nadu), South India” has been carried out under the supervision of Prof. Geeta Asthana, Department of Botany, University of Lucknow, Lucknow. The dissertation provides an account of Moss diversity of Nilgiri hills. The study is mainly based on the specimens collected by Prof. S. C. Srivastava, Prof. Geeta Asthana, Dr. P. K. Verma, Dr. A. Alam and the author himself from various localities of Nilgiri hills time to time. All the specimens have been deposited in Lucknow University Hepatic Herbarium (LWU), Department of Botany, University of Lucknow, Lucknow.

The area of study ‘Nilgiri hills’ is the part of Western Ghats biodiversity hotspots and is situated at junction of Eastern Ghats and Western Ghats. The area (Nilgiri hills) is located in the most western district of Tamil Nadu state: Nilgiri district. The Nilgiri District covers an area of 2543 km² of which 142577 hectares area is forest area. The altitude of the district ranges between 1200 m and 2500 m above sea level. The highest peak in Nilgiri hills is Doddabetta peak with the height of 2623 m which is the second highest peak in peninsular India after Anaimudi in Annamalai hills range of Kerala. Nilgiri District is bounded by Karnataka State towards the north, by Coimbatore District and Erode District towards the east and by Kerala State towards the south and west. Nilgiri district is divided into 6 zones i.e. Ootacamund, Upper Bhawani, Coonoor, Kotagiri, Gudalur and Mukuruthy. As the area comes in hot spot area, it shows rich biodiversity. The climatic condition of the area is quite favorable for the growth of bryophytes both liverworts and mosses. The present document deals with the moss diversity of the area.

The present study is based on the investigation of large number of specimens available at Lucknow University Hepatic Herbarium, Department of Botany, University of Lucknow, Lucknow (LWU). The plants collections were made periodically in the years 2000-2006 & 2011 in different seasons. The area has been surveyed thoroughly and the plants have been collected from all possible habitats at various locations in Nilgiri hills. The collection sites are Ootacamund (Pykara, Glenmorgan, Moyar Reserve Forest, Government Botanical Garden, Kamraj Sagar, Doddabetta, Theetukul Pine forest, Emerald), Gudalur (Naduvattum, Pandalur, Frog Hill view point, Law’s Fall, Wilson plantation), Coonoor (Sim’s Park, Lamb’s Rock, Bandishola), Kotagiri (Kilkotagiri), Mukuruthy (Mukuruthy lake, Parson’s valley, Governor sholai), Upper Bhawani (Avalanche, Porthimund Reserve forest). The study reveals that Ootacamund is very rich locality with 30 species of mosses followed by Mukuruthy with 23 species, Coonoor with 14 species, Upper Bhavani with 12 species, Kotagiri with 7 species and Gudalur with 2 species.

The present document provides morpho-taxonomic observations on 51 taxa of mosses including acrocarpous as well as pleurocarpous mosses, supplemented with relevant illustrations. Short descriptions of each rank of taxa including orders, families and genera with the keys to segregate them have been provided. Each species dealt with the complete morpho-taxonomic details as far as possible, type locality, habitat diversity, range of their distribution in the world, in the country (India) and in the area of study (Nilgiri hills), details of specimens examined, the characteristic of the species, a brief discussion on its affinities with closely related taxon and a notes on its status in Nilgiri hills. The document is supplemented with 63 plates, 3 maps, 1 pie chart, 1 venn diagram, 5 histograms and 2 tables.
The present study of mosses in Nilgiri hills reports the occurrence of 51 taxa belonging to two orders i.e. Polytrichales and Bryales. The Bryales order is represented by 49 species belonging to 30 genera and 22 families. It is the largest order followed by Polytrichales with only 2 species belonging to single genus and single family.

In the order Bryales the family Bryaceae (3 genera & 7 species) is the largest family followed by Brachytheciaceae (3 genera & 4 species), Meteoriaceae (3 genera & 3 species), Orthotrichaceae (2 genera & 4 species), Pottiaceae (2 genera & 2 species), Dicranaceae (1 genus & 6 species), Fabroniaceae (1 genus & 4 species), Entodontaceae (1 genus & 3 species), Sematophyllaceae (1 genus & 2 species), Daltoniaceae (1 genus & 2 species), Funariaceae (1 genus & 1 species), Splachnaceae (1 genus & 1 species), Erpodiaeae (1 genus & 1 species), Mniaceae (1 genus & 1 species), Bartramiaeae (1 genus & 1 species), Thuidiaeae (1 genus & 1 species), Hypnaceae (1 genus & 1 species), Pterobryaceae (1 genus & 1 species), Neckeraeae (1 genus & 1 species), Hypopterygiaceae (1 genus & 1 species), Ditrichiaeae (1 genus & 1 species) and Grimmiiaeae (1 genus & 1 species).

Hal.), *Tortula Hedw.* (*Tortula muralis Hedw.*), *Syntrichia Brid.* (*Syntrichia fragilis* (J. Taylor) Ochyra), *Ditrichum Hamp* (*Ditrichum heteromallum var. emodi* Gangulee) and *Grimmia Hedw.* (*Grimmia longirostris* Hook.) are represented by single species each. Order Polytrichales is represented by single genus *Pogonatum* P. Beauv. with two species (*Pogonatum neesii* (Müll. Hal.) Dozy & *Pogonatum microstomum* (Schwägr.) Brid.).

Out of 51 taxa dealt in the present work, 4 taxa are endemic to India, 4 taxa are new to India, 7 taxa are new to South India, and 14 taxa are new to Nilgiri hills.

**Species endemic to India (4):** *Fabronia madurensis* Dix. & P. Vard., *Daltonia decolyi* Gangulee, *Macromitrium hamatum* Dixon and *Ditrichum heteromallum var. emodi* Gangulee.


**Species new to South India (7):** *Macromitrium hymenostomum* Mont., *Brachythecium velutinum* (Hedw.) B. S. G., *Homaliodendron scalpellifolium* (Mitt.) M. Fleisch., *Daltonia marginata* Griff., *Daltonia decolei* Gangulee, *Campylopus pyriformis* (Schultz) Brid. and *Ditrichum heteromallum var. emodi* Gangulee.

During present study 51 taxa have been investigated and illustrated which belongs to 2 orders, 23 families and 31 genera. Out of 23 families dealt in the present work, the family Bryaceae is largest that consists of 3 genera and 7 species followed by Brachytheciaceae and Meteoriaceae that consist of 3 genera & 4 species and 3 genera & 3 species respectively. Out of 31 genera, *Campylopus* is the largest genus that consists of 6 species followed by *Fabronia* and *Bryum* that consists of 4 and 3 species respectively. Out of 51 identified taxa 34 taxa are pleurocarpous and 17 taxa are acrocarpous. The study reveals that pleurocarpous mosses are more dominant than acrocarpous mosses showing different types of growth forms: Turf, Cushion, Weft, Pendants, Fans and Dendroids. Out of 51 identified taxa, 34 taxa are epiphytic, 10 taxa terrestrial and 7 taxa are both epiphytic as well as terrestrial.

Prior to present work, 200 moss taxa were reported from Nilgiri hills so far which belong to 2 orders, 38 families and 93 genera. During present study 25 taxa have been reported for the first time from study area. The total numbers of moss taxa in Nilgiri hills are now 225, belonging to 40 families and 95 genera. Two families: Daltoniaceae and Erpodiaceae and two genera: *Daltonia* and *Aulacopilum* are new additions to the mosses of Nilgiri hills. The present study, as well as earlier studies as revealed by review of literature, clearly indicates the richness of area and still further scope of more additions in the moss flora of Nilgiri hills.