

and Camera (Nikon D810). A total of 30,000 herbarium specimens have already been digitized and KATH is planning to upload the digitized herbarium in online database.

5. Xylarium section

This section conducts research on the internal structure of the wood (Vessels, Fibers, Parenchyma, Medullary rays etc.) in order to identify the tree species as well as the quality of the woods. Different plant species exhibit different characteristics regarding the colour, texture, size of vessels, annual rings, etc. in their woods. The climatic condition of an area causes variation in the wood anatomy (especially tree species). This section has made lots of inputs to study the climate induced variation in wood anatomy of different species. Till date, the internal structures of more than 135 species of woody plants have been studied and more than 500 samples of the wood of different tree species have been preserved.



6. Plant Ecology section

This section deals with the study of ecosystems, relationship between the plant species and the impact of different climatic and topographic factors upon the occurrence as well as status of the plant species in a population. Study of the rare, threatened and endemic plants of Nepal and the impact of climate change on their occurrence, status and diversity have been prioritized by this section.



7. Cytology section

Sometimes the identification of plant species (up to species level or, variety level or, any other infra-specific taxon) may become difficult only through the morphological characteristics. Thus, cytology section deals with the study of internal structure of cells, structure of chromosomes, chromosome number, etc. for the identification.

8. Plant Protection section

Biological invasion, environmental degradation, human and animal disturbances are some of the serious problems creating degradation of biodiversity. This section deals with the impact of environmental degradation, anthropogenic disturbance and biological invasion upon the plant species and identifies the methods to prevent infection, control plant diseases as well as invasion.

Museum

NHPL also has a museum which preserves the samples of economically important plants and carpological collections. About 700 museum specimens are preserved and categorized according to their economic importance (medicinal, food, fiber etc.) and parts used (flowers, fruits, seeds, bark, stem, roots etc.).



Library

The library of National Herbarium and Plant Laboratories contains 3,231 books and 2,115 journals related to plant species, floras, and fascicles on flora of Nepal.

Services

NHPL has been continuously working on the identification of herbarium specimens brought by students, national and international researchers, institutions, traders, general public as well as wood samples brought by the Division Forest Offices and the Police authority. Similarly, visiting students from different schools, colleges and universities are provided with detailed information regarding herbarium collection, preparation techniques, its importance and utilization.



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National Herbarium and Plant Laboratories (NHPL) is located in Godavari, at the base of Phulchoki hills in the south-eastern part of the Kathmandu valley. It is about 10 km away from Satdobato, which is the main entrance to Godavari. It was formerly established as the Botanical Survey and Herbarium in 1961 under the then Department of Medicinal Plants and later in 1989 it was renamed as National Herbarium and Plant Laboratories. It is one of the central offices of Department of Plant Resources under the Ministry of Forests and Environment. NHPL is internationally abbreviated and recognized as KATH herbarium. NHPL aims at carrying out survey, collection, preparation, identification and preservation of herbarium specimens and documentation of plant resources within the country. These herbarium specimens provide an authentic record of the plant species found in Nepal for the documentation of flora of Nepal. About 165,000 herbarium specimens of both flowering and non-flowering plants have been housed. NHPL facilitates the scientific researchers as well as general public in plant identification, proper utilization and conservation of the plant resources. There are eight technical sections and one administrative section for conducting research activities and providing services related to the plant resources.

1. Phanerogams section

Phanerogams section deals with the study and documentation of angiosperms and gymnosperms as well as collection, preparation, identification and housing of herbarium specimens and their arrangement according to the accepted system of classification. Herbarium specimens are collected, pressed, dried and identified plant specimens which includes whole plant (herb) or plant twig/parts (trees, shrubs or climbers) with flowers or fruits, mounted on the herbarium sheets with detail information containing scientific name, family, collectors, collection date, number and locality along with brief field note about that plant. The place where these herbarium specimens are arranged and preserved according to an accepted system of classification is called as herbarium.



About 1,45,000 herbarium specimens of angiosperms and gymnosperms have been housed and systematically arranged according to Bentham and Hooker system of classification. Based upon the record of herbarium specimens preserved in

different herbaria of the world, 5,309 flowering plant species are found in Nepal and 4,589 species of flowering plants are housed at KATH. Similarly, 28 species of gymnosperms are reported from Nepal and 24 species are deposited at KATH. The scientific name and description of the plants are always based upon the herbarium specimens or illustrations. Those herbarium specimens used and cited by the author while describing and naming the plant for first time in the original description (Protologue) are known as Type specimens. Altogether, 96 type specimens of flowering plants have been housed at KATH.

Those plant species which are found only in Nepal and not in other parts of the world are endemic to Nepal. A total of 312 species of flowering plants are endemic to Nepal and herbarium specimens of 135 such plants are housed at KATH. The detail information of the herbarium specimens housed at KATH have been published in the *Catalogue of Nepalese Flowering Plants Part I, II, III, Supplement 1*, and *A Handbook of the Flowering Plants of Nepal Vol. 1* in 2010, 2011, 2012, 2015 and 2017 respectively. Similarly, more than dozens of local floras and fascicles of different families have been published and the Flora of Nepal is in course of publication in 10 volumes.

2. Cryptogams section (Algae, Fungi and Lichens)

This section focuses on the documentation, collection and identification of algae, fungi and lichens found in different parts of Nepal. A total of 1,001 species of algae and 792 species of lichens have been reported from Nepal. About 1,107 samples of lichens collected from different parts of Nepal have been preserved in this section. Similarly, 2,467 species of fungi are found in Nepal, among them and 131 species of fungi are endemic to Nepal. Out of 1,271 species of recorded macro fungi, 140 species of fungi are edible, and 65 species of fungi are medicinally important. About 3,500 well labelled fungi specimens have been preserved in the Mycology section of KATH. Based upon these specimens, the *Fungi of Nepal part 1, 2, 3* and *Fungi of Lalitpur* have been already published. The *Catalogue of Fungi* (2014) has also been published, which includes the brief information about the fungi preserved at KATH.



3. Cryptogams section (Bryophytes and Pteridophytes)

This section aims on conducting the research on collection, identification and documentation of bryophytes and pteridophytes found in different parts of Nepal. A total of 1,213 species of bryophytes and 580 species of pteridophytes have been reported from Nepal. Two species of ferns are endemic to Nepal. A total of 18,000 herbarium specimens with four type specimens of pteridophytes are housed at KATH. Based on the herbarium specimens housed at KATH and different herbaria of the worlds, the *Ferns & Fern-Allies of Nepal Volume I, II* have been published in 2015 and 2019 respectively. To enhance the Bryological research in Nepal, *Bryophytes: Collection, Preservation and Identification (Reference to Nepal)* have been published by Department of Plant Resources in 2019.



4. Digitization and Publicity section

Digitization of herbarium is a method of keeping electronic record of data within a database which contains information about the specimen (Scientific name, collection number, locality etc.). Sometimes the herbarium specimens may become inaccessible to the scientific researchers, students as well as general public due to several unavoidable circumstances. Thus, the concept of virtual herbarium is gaining popularity among the herbaria worldwide. Digitization of the herbarium specimens help to keep a record of the herbarium specimens in the electronic media with a high-resolution image, which helps to preserve data for the future.

The high-resolution images are obtained through the Herbscan (Epson 10000XL)

