

Herbarium- a National Facility

1. Objectives

Herbarium is a place, where plants collected from far and wide are preserved in pressed and dried condition and are kept in pigeon holes of almirahs according to some accepted system of classification. It is a great filing system for information about plants primarily in the form of actual specimens and secondarily in the form of recorded notes on labels attached on the sheets. No doubt it acts as a data bank and caters the needs students, teachers, foresters and other plant-based professionals. The Herbarium of CSIR-National Botanical Research Institute is relatively a new organisation when compared to some large herbaria in the World as well as in India. This herbarium was established in 1953 and is now internationally known with its acronym LWG and has been recognised as National Repository for Indian flora by National Biodiversity Authority of India. The credit of establishing this herbarium goes to Prof. K.N. Kaul, the founder Director of the Institute. Considering the importance of this herbarium in botanical researches, it has now been given the status of “National Facility” in CSIR system. The current holding of LWG Herbarium is about 2,66,000 specimens of which 98,000 specimens are of higher plants and 1,68,000 specimens of lower plants. Apart from this, there are 290 Type specimens and 895 Type photographs.

The major objectives of LWG Herbarium are:

- To develop and maintain a herbarium as per international norms.
- To undertake floristic and revisionary studies on Indian flora.
- Survey, collection, identification and documentation of floral wealth of the country.
- To carry out biodiversity assessment.
- To study and monitor the RET plants.
- To maintain active link with other institutions through loan and exchange of herbarium specimens and related literature.
- To act as a service centre for solving all queries about plants.

2. Goals:

- Conservatory for plant material and related data
- Serves as a fundamental resource for identification of plants of India as well as of globe.
- Serves as easiest and efficient source for plant biodiversity information.
- Serves as a repository of historic collections and at times acts as the only record of past vegetation.
- Aids in assessment and cataloguing of all species of economic values.
- Aids in assessment of conservation status of RET taxa.
- Helps in development of digital data-bases on plants.

3. Competencies

Scientists of all groups viz., Angiosperms, Gymnosperms, Ferns, Bryophytes, Lichens and Algae are competent to carry out taxonomic research which is also aimed at enrichment of herbarium with fresh collections. There are specialists in several Angiosperm genera like *Ixora*, *Berberis*, *Pedicularis*, *Citrus*, *Phyllanthus*, *Podophyllum*, *Aconitum*, *Tricholepis*, *Astragalus*, *Oxytropis* and leguminous Tribes Thermopsidae, Genisteae, Trifoliae and Lotiae. Similarly there is core competence in lower group of plants like Lichens, Bryophytes, Pteridophytes and Algae. Apart from revisionary studies there are generalists to carry out floristic studies, especially in western Himalayan region and Gangetic plain.

4. Facilities

There is a well established herbarium with all amenities equipped with Zoom microscopes for study of plant specimens and attached library containing all sorts of Periodicals, Floras and Taxonomic treatise.

5. Highlights of Current research

Currently Herbarium and group is involved in following activities:

- Digitization of Herbarium: Digitization of about 22,000 herbarium specimens has so far been done. It includes a scanning of all the specimens and data contained on the labels of herbarium sheets.
- CTKDL - a Net-work Project: Scientific validation of nomenclature of 2642 species completed. Uploaded digital herbarium images of 700 species, and live plant images of 150 species. Morphological description of 500 species for CTKDL has been accomplished so far. Prepared a write up on Biodiversity with emphasis on medicinal plant distribution, their hotspots and conservation.
- Propagation and reproductive biology of some RET taxa: A DST, New Delhi funded project to investigate the bottle neck in natural reproduction and to develop propagation methods using both in-vitro and conventional methods for the conservation of some critically endangered taxa of high medicinal potential.

6. List of on-going projects:

- Digitization of Herbarium (SIP-005). Duration 5 years under 11th 5year plan.
PI: Dr. Tariq Husain: hustar_2000@yahoo.co.uk
Co-PI's: Mr. Baleshwar, Dr. Bhaskar Datt
- CTKDL. Duration February 2010 to march 2011
PI: Dr. Tariq Husain: hustar_2000@yahoo.co.uk
Co-PI's: Dr. T.S. Rana, Baleshwar, Dr. Bhaskar Datt
- Propagation and reproductive biology for conservation of some critically endangered highly potential medicinal plants. Duration 3 years : Nov. 2010 to Nov. 2013.
Project co-ordinator: Dr. Tariq Husain: hustar_2000@yahoo.co.uk
PI : Dr. Priyanka Agnihotri

7. Significant achievements:

- Digitization of 22,000 herbarium specimens accomplished.
- Scientific validation of nomenclature of 2642 species and uploading of morphological descriptions of 500 species, 700 images of herbarium specimens and live plant images of 150 plants accomplished for CTKDL.

8. Recent publications (of Last 5 Years)

1. Husain, T. and Agnihotri, P. 2006. Geographical distribution of *Pedicularis* L. (Scrophulariaceae) in India. *Newsletter of Himal. Bot.* 37: 25-33.
2. Husain, T., Garg, A., Agnihotri, P. and Mill. R.R. 2006. A revision of *Pedicularis* series *Curvipes* (Prain) Hurus. (Orobanchaceae). *Edinb. Journ. Bot.* 63(1): 49-65.
3. Maliya, S.D. 2006. The aquatic and wetland flora of Mainpuri district, Uttar Pradesh, (India). *J. Econ. Taxon. Bot.* 30 (3): 533- 546.
4. Kumar, V. and Datt, B. 2006. *Eryngium foetidum* L.: an overlooked species for erstwhile Madhya Pradesh. *J. Econ. Taxon. Bot.* 30 (2): 303-304.
5. T. Husain and Garg, A. 2006. Lectotypification of *Pedicularis roylei* var. *speciosa* (Scrophulariaceae) and differentiation from the type variety. *Edinb. J. Bot.* 62(1&2): 93-94.
6. Husain, T. and Agnihotri, P. 2007. Taxonomic notes on *Pedicularis* L. series *Robustae* Prain (Scrophulariaceae). *J. Econ. Taxon. Bot.* 31 (3): 696-700.
7. Agnihotri, P. 2007. *Pedicularis microcalyx* Hook. f. (Scrophulariaceae)- A less known species from Eastern Himalaya. *Geobios* 34 (1) 97-98.
8. Maliya, S.D. 2007. Rare species of wildlife Sanctuary Katarniyaghat, District Baharaich, Uttar Pradesh, India. *Indian For.* 133 (8) 1052-1056.
9. Asthana, A., Husain, T and Datt, B. 2007. A study of the floral ecology of Bhimbetka World Heritage Site (Madhya Pradesh). *Indian J. For.* 30(4): 459-461.
10. Agnihotri, P. and Husain, T. 2008. A new variety of *Pedicularis pectinata* Wallich ex Benth. (Scrophulariaceae) from Western Himalaya of India. *Phytotaxonomy* 8: 13-20.
11. Husain, T. and Agnihotri, P. 2008. *Pedicularis cheilanthifolia* Schrenk. (Scrophulariaceae) complex in the Indian Himalayas. *Phytotaxonomy* 8: 62-64.
12. Baleshwar, Datt, B. and. Husain, T. 2008. Type collections in the herbarium of National Botanical Research Institute, Lucknow (LWG). *J. Econ. Taxon. Bot.* 32(3): 673-677.

13. Agnihotri, P., Husain, T. and Maliya, S.D.. 2008. Aquatic flora of some notified Bird Sanctuaries of U.P. *Indian For.* 134(10): 1398-1401.
14. Husain, T. and Agnihotri, P. 2009. Invasive Alien species and climate change. In: Proceedings of National Conference on Invasive Alien species a threat to native Biodiversity, pp. 36-39.
15. Agnihotri, P. ,Husain, T. and Singh, H. 2009. Nakuleshwar: A newly discovered sacred grove from Pithoragarh District. *Sci. & Cult.* 75 (1-2): 42.
16. Agnihotri, P. and Husain, T. 2009. Analysis of species diversity in *Pedicularis* associations of Eastern Himalaya. *Indian J. For.* 32(1): 165-170.
17. Agnihotri, P. and T. Husain. 2009. Effect of climate change on the phenology of *Hypericum oblongifolium* Choisy (Hypericaceae). *Geobios* 36(4): 317-318.
18. Husain, T. and Agnihotri, P. 2009. *Berberis glaucocarpa* Stapf. (Berberidaceae) a new report from Nainital hills. *Flora and Fauna.* 15(2): 357-358.
19. S.K. Jain, M.K. Vasudeva Rao & P. Agnihotri. 2009. Name changes in some more common economic plants. *Phytotaxonomy*,9: 99-108.
20. T. Husain & P. Agnihotri. 2009. Typification of some *Pedicularis* (Scrophulariaceae) species from the Himalaya. *Phytotaxonomy.* 9: 114-115.
21. Singh, H., Husain, T. and Agnihotri, P. 2010. Haat Kali sacred grove, Central Himalaya, Uttarakhand. *Curr. Sci.* 98 (3): 290.
22. Singh, H., Husain, T and Butt, F.A.. 2010. Ethno-medicinal Plants and their Conservation through sacred groves in Pithoragarh District of Central Himalaya, Uttarakhand. *Geobios* 37(1): 53-56.
23. Maliya, S.D. and Datt, B. 2010. A contribution to the flora of Katarniyaghat Wildlife Sanctuary, Bahraich district, U.P. *J. Econ. Taxon. Bot.* 34 (1): 42-68.
24. Maliya, S.D. and Datt, B 2010. Unique application of *Luffa echinata* Roxb. (Cucurbitaceae) to cure jaundice. *J. Non-Timber For. Prod.* 17 (10): 43-44.
25. Husain, T., Datt, B. and Chaudhary, L.B., Asthana, A and Agnihotri, P. 2010. Floristic diversity of Bhimbetka World Heritage Site (Madhya Pradesh)- an over view. *Indian For.* 136: 215-223.
26. S. Roy, A. Tyagi, V. Shukla, A. Kumar, U.M. Singh, L.B. Chaudhary, B. Datt, S.K. Bag, P.K.Singh, K.N. Nair, T. Husain & R. Tuli. 2010. Universal plant DNA barcode loci may not work in complex group: a case study with Indian *Berberis* species. *PLoS ONE*/www.plosone.org. /October 2010/ Vol.5/ Issue10/ e13674.

27. T. Husain, P. Agnihotri, A.K. Paliwal & M.Singh. 2010. Global Climate Change Impact on Species Distribution in Nainital: A Future Challenge. In: Advancement Science and Technology. Eds. Mahipal Singh & A.K. Paliwal.142-153.
28. T. Husain, H. Singh, P.C. Pande, A.K. Paliwal & P. Agnihotri. 2010. Role of Sacred Groves in Biodiversity Conservation – A case study from Haat Kali sacred grove, Pithoragarh (Uttarakhand). In: Advancement Science and Technology. Eds. Mahipal Singh & A.K. Paliwal. 85-89.
29. P. Agnihotri, S. Sharma, V. Dixit, H. Singh & T. Husain. 2010. Sacred groves from Kumaon Himalaya. **Curr. Sci.** 99 (8): 996-997.
30. H. Singh, P. Agnihotri, P.C. Pande & T. Husain. 2011. Biodiversity conservation through traditional beliefs system in Indian Himalaya: A case study from Nakuleshwar Sacred Grove. **Environmentalist.** (Published on line)

9. Names of Scientists working in Herbarium with their designations:

- Dr. Tariq Husain, Senior Principal Scientist
- Mr. Baleshwar, Scientist

10. Names of Technical Staff

- Dr. Bhaskar Datt, Senior Technical Officer (3).
- Dr. (Miss) Sushma Verma, Technical Officer
- Shri Mohan Lal, Helper (temporary status)

11. Res. Fellows/ PA's/ RA's

- Dr. (Miss) Priyanka Agnihotri, Women Scientist.
- Dr. Harsh Singh, PA.
- Mr. Kamlesh Singh, PA
- Miss Veena Dixit, PA
- Miss Roli Chaudhary, PA