



**ANNUAL SCIENTIFIC MEET  
VIRTUAL MODE:-3-4 MAY, 2021**

**BOTANICAL SURVEY OF INDIA  
NORTHERN REGIONAL CENTRE  
DEHRADUN**



**Dr S.K.Singh  
Scientist E & Head of Office**



## BSI, NRC at a Glance:

- » Established: 1st August, 1956
- » Jurisdiction: Uttarakhand, Punjab, Haryana and Chandigarh
- » Area: 2, 15,162 sq km
- » Protected Area Network Area: 15,208.2569 sq km
- » Biosphere Reserve: 1
- » National Parks: 8
- » Wildlife Sanctuaries: 30
- » Tiger Reserves: 1 (Corbett, Uttarakhand)
- » Wetlands: 09 (wetlands under Ramsar Convention: 4)
- » Explorations: 372
- » Expeditions: 15
- » Herbarium Acronym: BSD
  
- » Major functional units to undertake various research activities: Herbarium, Museum, Library, Desk Top Publishing (Computer) Unit, Photography, Tissue Culture and Cytology Laboratory, SEM, Data Base Cell, Experimental Botanical Garden, Zingiber section, Polyhouse, Orchidarium, Fernary, Gymnosperm collection Nature Reserve, Medicinal Plant Garden.





## HERBARIUM(BSD)

Sr. No.	Herbarium Maintenance	BSD
1.	No. of specimens mounted/remounted/labelled	13928
2.	No. of herbarium sheets stitched/restitched/cleaned/ poisoned/fumigated/dusted	92986
3.	No. of herbarium sheets accessioned	4448
4.	No. of specimens incorporated/ re-incorporated	7817
5.	No. of specimens sent on loan	--
6.	No. of loaned/ gifted specimens/ returned/ exchanged	--
7.	No. of specimens identified	8180
8.	No. of Genus/ species covers changed	636
9.	No. of specimens segregated	2638
10.	Documentation of existing herbaria sheets at herbaria/entry in Excel sheet/ Field data written	4954
11.	Digitization and scanning of herbarium specimens	3541

Imaging of plant specimens through **Scanning Electron Microscope** in BSD: **1034**

**Revenue Earning:** Revenue generated through Plant identification Rs. -6000/- and sale of BSI Publication= Rs. 99858/-- **Visitors attended: 64**



## AAP PROJECTS (2020-21) PROGRESS & ACHIEVEMENTS

S.No.	Title of the Project	Executing officials	Achievements during the year 2020-21
01	Pteridophytes Flora of India ((Vol. I, II, & III)	Dr B.S. Kholia, Scientist-E, NRC, Dehradun	Field data filled:1860 Identified:1191 Incorporated : 1429 Described:40
02	Flora of India, [ Zingiberaceae [2020]	Dr. S. K. Singh, Sci.-'E', Dr. Ramesh Kumar, Sci.-'D' Dr Sachin Sharma and Dr. Sameer Patil, Botanist	Described 75; remaing to be described
03	Taxonomic revision of genus Taraxacum F.H.Wigg. in India	Dr. Sameer Patil (Botanist) & Dr. S.K. Singh, Scientist E	SEM study Taraxacum sps. : 07 Prepared GIS and RS based distribution mapping through ENM of Taraxacum species in Western Himalayas
04	Scanning Electron Microscope (SEM) study of Achenes of the genus Ranunculus L. and Thalictrum Tourn. ex L. in North West Himalaya	Dr. P. Kumar Deroliya Botanical Assistant and Dr. S.K. Singh, Sci.-'E'	No. of species studied under SEM: 27



05	Cytological studies in some selected chromosomally lesser-known/unknown plants and Liverworts from Botanic Garden of BSI, NRC, Dehradun, and adjoining areas.	Dr. Puneet Kumar, Sci.-'C' and Dr. S.K. Singh, Sci.-'E'	No. of field tours conducted : 03 local one day No. of species collected: 47 No. of species Identified:47 Cytologically studied: 37
06	Ethnobotanical study of Tharu and Bhoja tribe of Uttarakhand, India.	Dr. Harish Singh, Sci.-'E'	Area covered: 1545sq Tour: 03 Species collected: 284 Incorporated: 95
07	In vitro propagation and standardization of Micropropagation protocol for endemic and threatened species of the North West Himalaya.	Dr. Giriraj Singh Panwar, Scientist-D and Dr. Bhavana Joshi, Botanist	Standardized a protocol for <i>Eulophia dabia- Rhynchosyilis retusa</i> and <i>Nepenthes khasiana</i> .





## **Publications**

- » Books: 01
- » Number of papers in National Journals:11
- » Number of papers in International Journals: 11



# NEW PROJECT PROPOSALS

## New Proposed Projects. 02

- ❖ Assessment of Plant diversity in Rajaji National Park, Uttarakhand. (*New project*)  
**Executing officials:** Dr. Puneet Kumar, Scientist-C, Dr. S.K. Singh, Scientist-E & Dr. P.K. Deroliya, Bot. Asst., Poulami Ghosh, Bot. Asst.
  
- ❖ Backlog clearance of unidentified Herbarium sheets at BSD. (*New project*)  
**Executing officials:** Dr. S.K Singh Scientist E, Subhasmit Bhattacharyya, Bot. Asstt., Poulami Ghosh, Bot. Asst., Latika Sagarwal, Bot. Asstt.





# EXPERIMENTAL BOTANIC GARDENS





Total Species conserved =591  
Angiosperms=512  
Pteridophytes= 79

Threatened=79  
Endemic= 9





# GLASS HOUSE







GREEN HOUSES





Number of species conserved=66





# FERN HOUSE





# POLYHOUSE





# PONDS





Last year



## DEVELOPMENTAL ACTIVITES DURING 2020-2021

At present







# Developing Cactarium







Face up liftment





# BSI , NRC New residential quarters T-3, 4 & 5





## NEWLY DEVELOPED MARSHY AREA

**Species introduced:** *Equisetum ramosissimum* Desf., *Acorus calamus* L., *Bacopa monnieri* (L.) Wettst. *Pogostemon pumilus* (Graham) Press, *Ceratopteris thalictroides* (L.) Brongn., *Cyathea spinulosa* Wall. ex Hook. *Ranunculus sceleratus* L





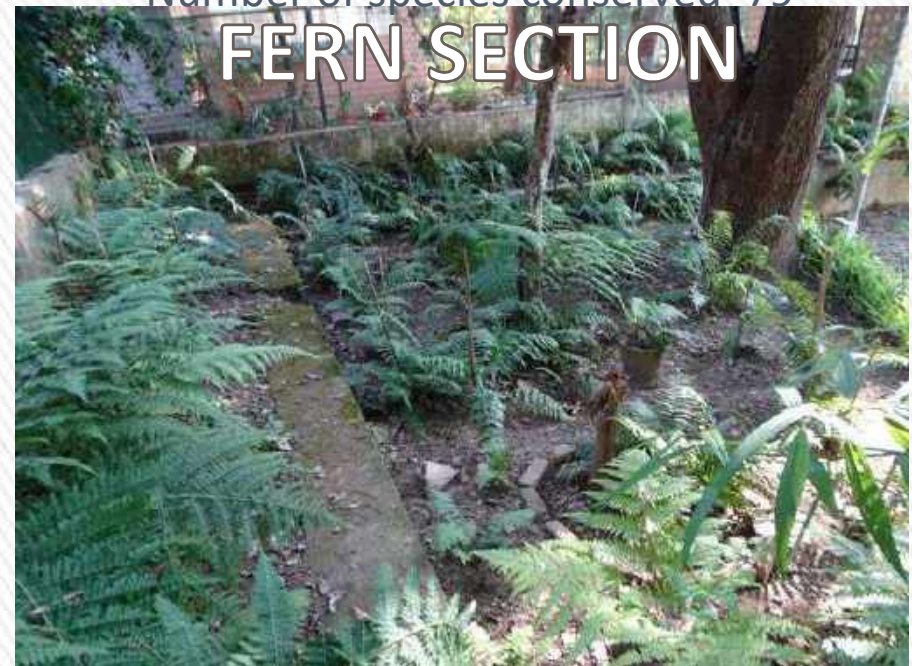


## ZINGIBER SECTION

Number of species conserved=32



Number of species conserved=79



## FERN SECTION





*Hedychium urophyllum*



*Globba orixensis*



*Hedychium thyrsoforme*



*Kaempferia rotunda*



*Hedychium coccinium*



*Roscoea purpurea*



# Newly developed house for alpine plants





# NURSERY





## **Ex-situ conservation of economic, endemic and threatened plant species of Western Himalaya through augmentation of Infrastructural facilities in associated botanical garden of NRC and documentation of monthly data on flowering and fruiting**

**Executing officials:** Dr. S.K. Singh, Scientist-E/HoO, Dr. B.S. Kholia, Scientist-D & Dr. P.K. Deroliya, Bot. Asst.

**Objective:** Collection of threatened and economically important plants species from biodiversity rich areas of Uttarakhand. Maintenance of germplasm collected. Documentation of data on phenology of species growing in the botanic garden.

Target	Progress made so far
<b>Collection of economic and threatened species</b>	<p>Collected and introduced 21 economic and threatened species viz., <i>Bulbophyllum cariniflorum</i> Rchb.f., <i>Bulbophyllum umbellatum</i> Lindl.; <i>Coelogyne cristata</i> Lindl.; <i>Cymbidium erythraeum</i> Lindl.; <i>Cymbidium iridioides</i> D.Don; <i>Dactylorhiza hatagirea</i> (D.Don) Soó; <i>Dendrobium crepidatum</i> Lindl. &amp; Paxton, <i>Dendrobium fimbriatum</i> Hook., <i>Dendrobium monticola</i> P.F. Hunt &amp; Summerh.; <i>Eria alba</i> Lindl.; <i>Eria globulifera</i> Seidenf.; <i>Oreorchis indica</i> (Lindl.) Hook.f.; <i>Zeuxine flava</i> (Wall. ex Lindl.) Trimen; <i>Celtis australis</i> L.; <i>Cyathea spinulosa</i> Wall. ex Hook.; <i>Potentilla incisifolia</i> Ruiz &amp; Pav., <i>Skimmia anquetilia</i> N. P. Taylor &amp; Airy Shaw; <i>Madhuca butyracea</i> (Roxb.) J.F.Macbr.; <i>Rhododendron arboretum</i> Smith, <i>Rhododendron barbatum</i> Wall. ex G. Don; <i>Selaginella</i> sp.</p> <p>Collected 04 aquatic plants namely <i>Vallisneria spirallis</i> L.; <i>Azolla pinnata</i> R. Br.; <i>Marsdenia roylei</i> Wight and <i>Potamogeton crispus</i> L. Experimental botanical garden of BSI, Dehradun, fern house and orchidarium is properly maintained.</p>
<b>Details of tour conducted:</b>	Total 02 Tours were conducted to Asan barrage & Karwapani swamp and Gopeshwar for collection of economic and threatened species.



# Threatened plant species under *ex-situ* conservation





# Threatened plant species under *ex-situ* conservation



*Cyathea spinulosa*



*Cycas beddomei*



*Phaius tankervilleae*



*Ephedra saxatilis*



*Nervilia crocifformis*



*Nervilia mackinonii*



# ENDEMIC plant species under *ex-situ* conservation



*Frerea indica*



*Phlomis superba*



*Pittosporum eriocarpum*



*Tricholepis roylei*



*Mahonia jaunsarensis*



*Mahonia jaunsarensis*



*Melissa flava*



*Magnolia kisopa*



# Propagation of *Musa velutina* H.Wendl. & Drude

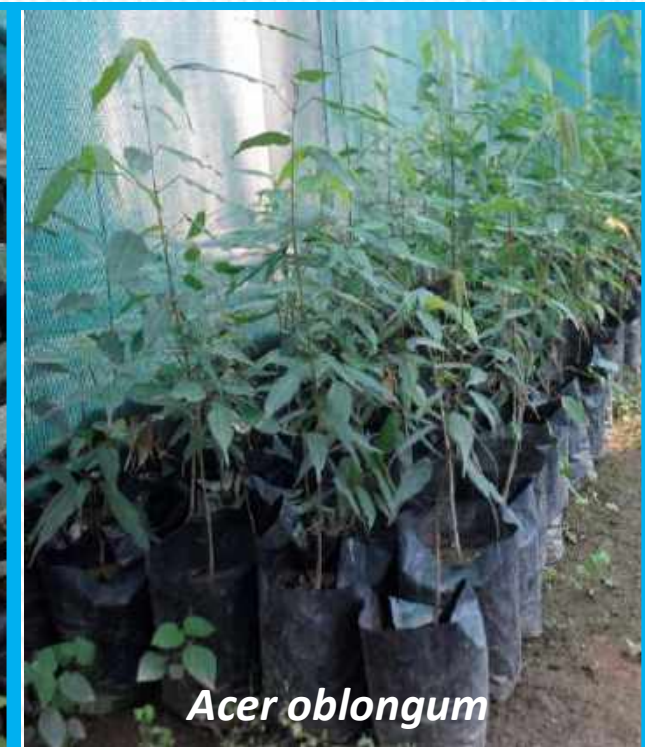


*Hairy Or Pink  
Banana*





## Macro-Propagation





# Medicinal plant species under *ex-situ* conservation





# ORCHIDS CONSERVATION







- *Pinus yunnanensis* var. *pygmaea* (Hsüeh) Hsüeh
- Germination rate was found to be 27% (March, 2021)





## THIRD PARTY EVALUATION of ABG project



Glimpses of interaction of HoO/PI and Senior scientists with Dr. Brij Lal, Sci-G, Retd. CSIR-IHBT, Palampur, HP during evaluation





# Ex-situ Conservation of EET species



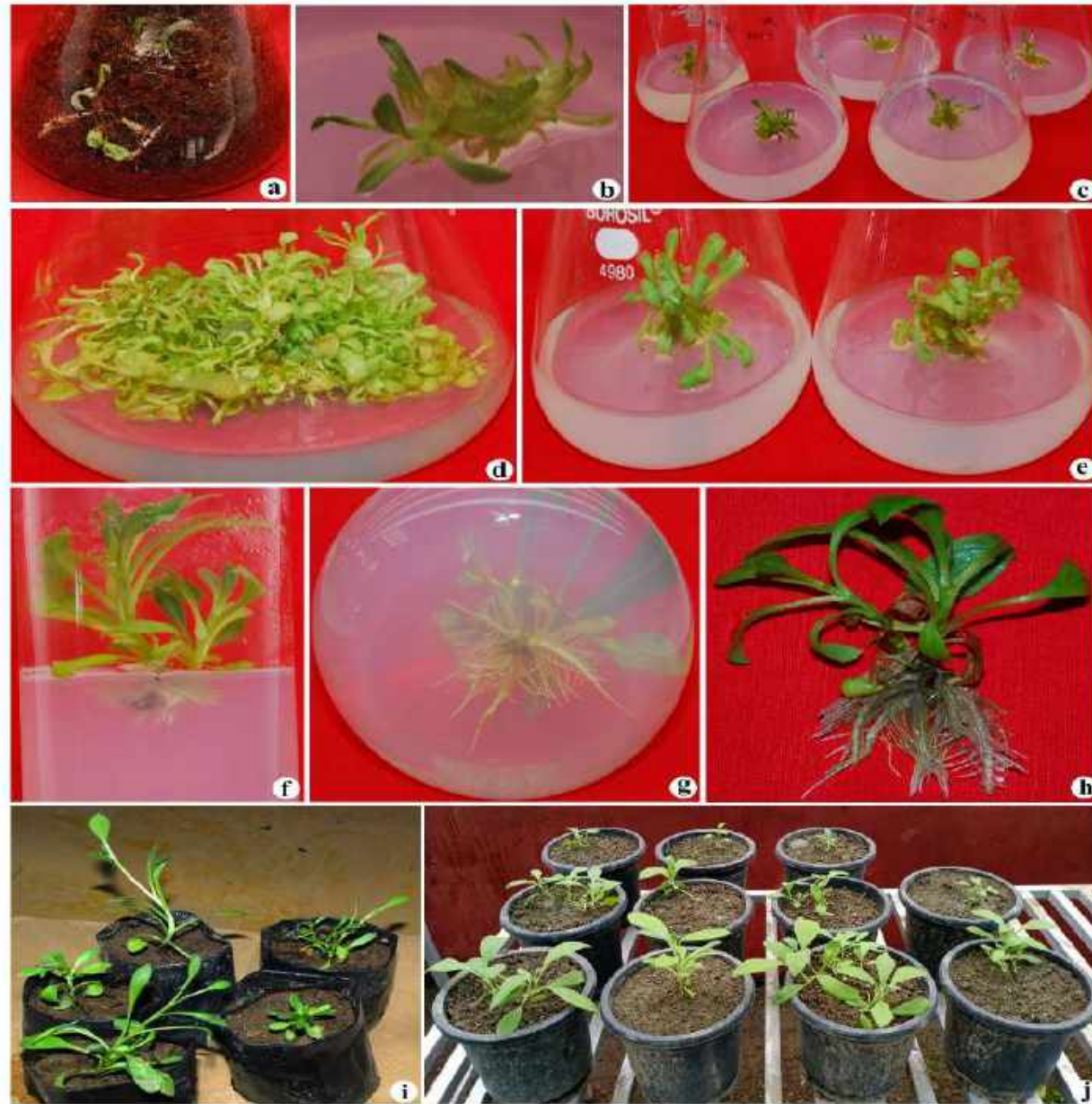


# Micro-propagation work done at NRC, Dehradun

Species	Family	IUCN Status
<i>Tricholepis roylei</i>	Asteraceae	CR & Point endemic
<i>Sophora mollis</i>	Fabaceae	EN
<i>Gentiana kurroo</i>	Gentianaceae	CR
<i>Nepenthes khasiana</i>	Nepenthaceae	CR
<i>Rhyncostylis retusa</i>	Orchidaceae	EN
<i>Eulophia dabia</i>	Orchidaceae	CR







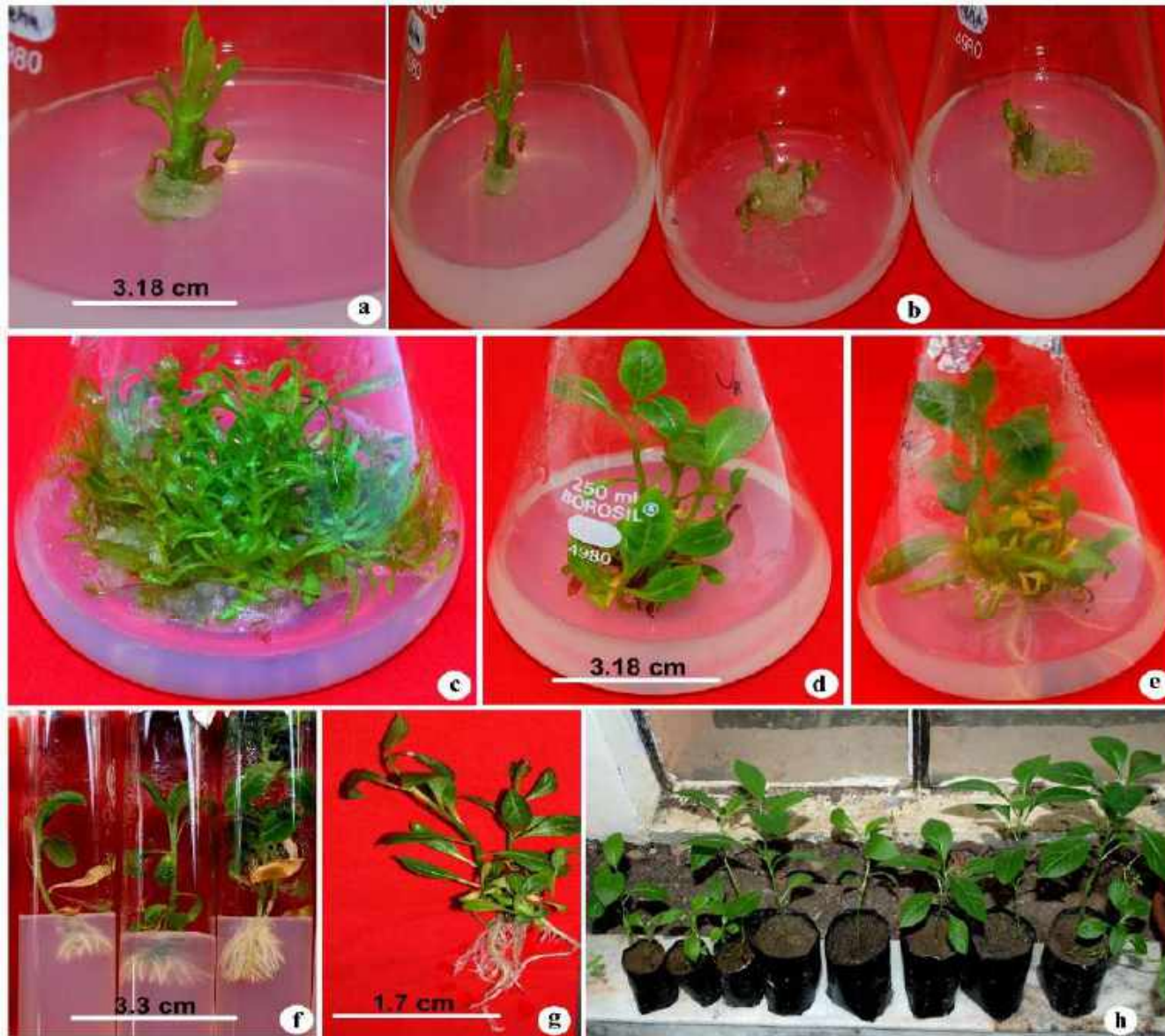
**Micropropagation of *Tricholepis roylei* (Asteraceae) : a narrow endemic, critically endangered herb of the North-West Himalaya**





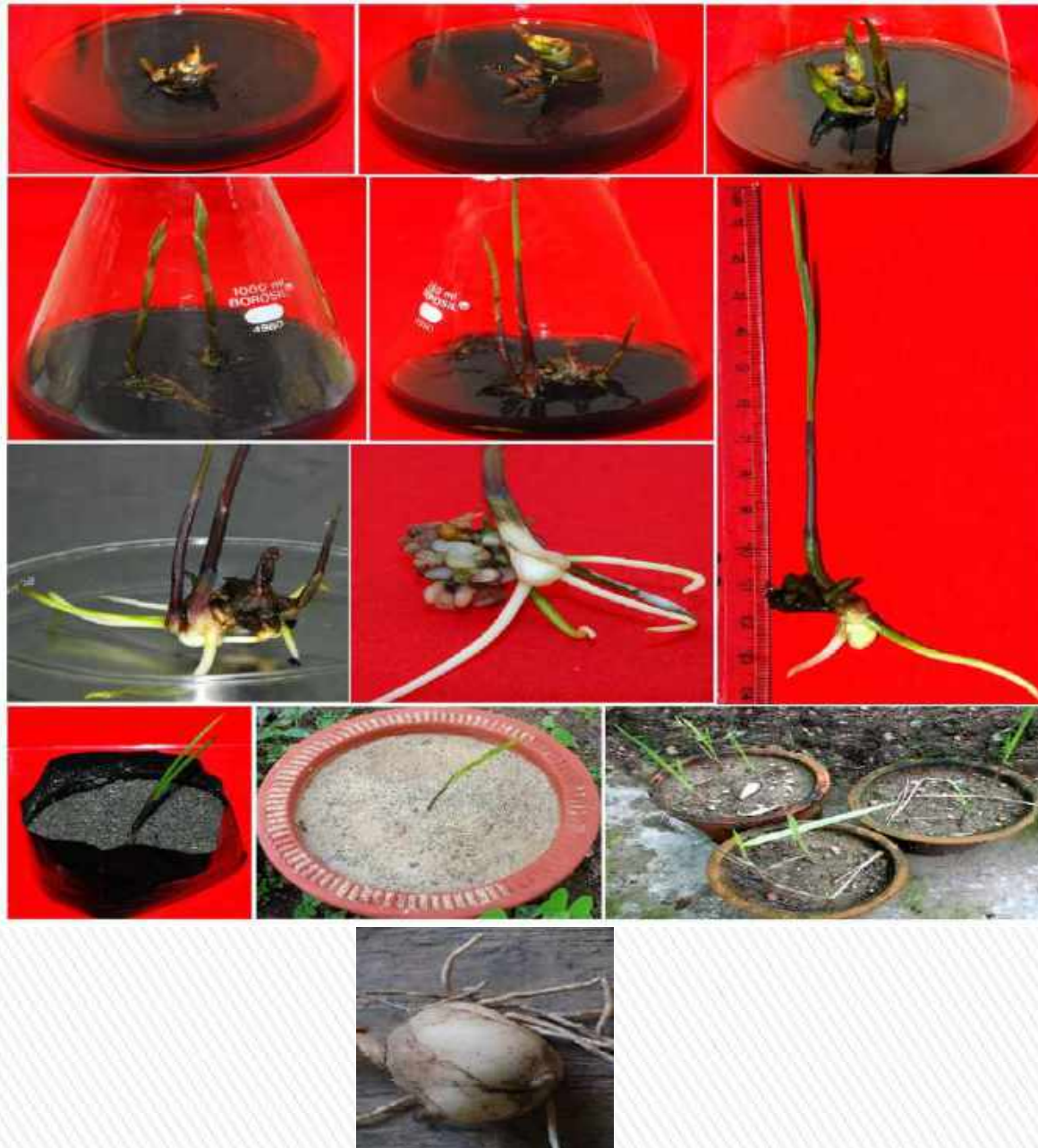
**Micropropagation of *Gentiana kurroo* (Gentianaceae): a critically endangered (CR), highly medicinal herb of the North-West Himalaya**





Micropropagation of *Vernonia amygdalina* (Asteraceae): an endangered (EN), anticancerous and ethnomedicinal species.





**Micropropagation of *Eulophia dabia* (Orchidaceae): a Critically Endangered (CR) and medicinal terrestrial orchid species.**





**Micropropagation of *Rhynchosstylis retusa* (Orchidaceae): an endangered and medicinal orchid species.**





**Micropropagation of *Nepenthes khasiana* (Nepenthaceae): a threatened, insectivorous pitcher plant of the North-East India.**



PLANTATION PROGRAMS UNDER

**NMHS (LG) & ABG Projects  
Habitat Rehabilitation under the  
Species Recovery Programmes  
(Ex-situ to In-situ/ Lab to Nature)**





# REINTRODUCTION, DISTRIBUTION AND PLANTATION





❖ **Plantation programme, saplings and plant sapling distribution:**

- ❖ World Environment Day and plantation programme organized by BSI, NRC on 05.06.20 and individuals of two threatened/economically important species, *Indopiptadenia oudhensis* and *Prunus cerasoides* were planted.
- ❖ About 200 plants of, *Terminalia elliptica* Willd.; *Cinnamomum camphora* (L.) J. Presl; *Elaeocarpus lacunosus* Wall. ex Kurz; *Indopiptadenia oudhensis* (Brandis) Brenan propagated in the garden were distributed to local people on the occasion of Ozone Day, 16.09.2020.
- ❖ About 1100 saplings rehabilitated in wild habitat and c. 1000 saplings given to BGIR, Noida and forest department under NMHS & ABG project.
- ❖ Provided plants of ten species, *Spilanthes acmella* (L.) L., *Asparagus racemosus* Willd., *Musa velutina* H. Wendl. & Drude, *Rauvolfia serpentina* (L.) Benth. ex Kurz, *Terminalia chebula* Retz., *Centella asiatica* (L.) Urb., *Tinospora* sp., *Cinnamomum zeylanica* Blume, *Bryophyllum pinnatum* (Lam.) Oken, *Chlorophytum* sp. for plantation programme by Maaty Biodiversity conservation & Societal research organization, Dehradun on 02.12.2020.
- ❖ NMHS team conducted a follow-up tour on 22.10.2020 to the type locality Bhadrachalam, Mussoorie to check the survival rate of the *Gentiana kurroo* Royle (Bhadrachalam, Mussoorie, the type locality) and *Jasminum Parkeri* Dunn (Cloud End, Mussoorie) planted in July, 2020 and also introduced *Indopiptadenia oudhensis* in the suitable wild habitat in the Bhopal Pani, Raipur Range-Dehradun under the NMHS project.





# EVENTS & ACTIVITIES

## Fit India Movement and Swachata Abhiyan- on 2<sup>nd</sup> October, 2020



**Himalayan Day, 9<sup>th</sup> September, 2020**

Plantation: Sps. Of *Aesculus*, *Quercus*, *Magnolia*, *Camellia* etc.

Online Slogan Writing and Sit & Draw Competition



**International Day of Forests (21<sup>st</sup> March, 2021)**



**International Mother Earth Day (22<sup>nd</sup> April, 2021)**

Plantation: *Indopiptadenia oudhensis* and *Prunus cerasoides*

**Vigilance Awareness Week (27<sup>th</sup> October to 2<sup>nd</sup> November, 2020)**  
Theme: Satark Bharat, Samriddh Bharat (Vigilant India, Prosperous India)





# EVENTS & ACTIVITIES

**World Ozone Day (16 September, 2020)**

PLANT DISTRIBUTION TO LOCALS: *Quercus*, *Indoptadenia* and *Prunus* Online Slogan Writing and Sit & Draw Competition



**Swachata Abhiyan Pakhwada (2<sup>nd</sup> to 16<sup>th</sup> October, 2020)**



**हिंदी पखवाड़ा कार्यक्रम (1-15 सितम्बर, 2020)**



वक्तव्य देते कार्यालयाध्यक्ष  
डॉ एस.के. सिंह

वरिष्ठ वैज्ञानिक  
डॉ बी.एस. खोलिया

प्रश्नोत्तरी प्रतियोगिता

हिंदी निबंध लेखन





THANK YOU