

# **BOTANICAL SURVEY OF INDIA**

## **ANNUAL RESEARCH PROGRAMMES 2021-22**



## ANNUAL RESEARCH PROGRAMMES 2021-22

AJC BOSE INDIAN BOTANIC GARDEN, HOWRAH

Sr. No.	Name of the Project	Period	Quantifiable deliverables for 2021–22
1.	<p><b>Caterpillar fungi in Himalaya: Morpho-taxonomy, Molecular phylogeny, Chemical &amp; nutraceutical properties</b></p> <p>Dr. Kanad Das, Scientist-E Dr. M. Hembrom, Botanist Sri Arvind Parihar, Bot. Asstt</p>	<p>2019 – 2021</p> <p><i>Extension for one year (upto March 2022) due to COVID-19 pandemic situation</i></p>	<p><b>Q1:</b> Literature Survey and documentation.</p> <p><b>Q2:</b> Literature Survey and documentation.</p> <p><b>Q3:</b> Two field tours: One field trip to Himachal Pradesh and another to Arunachal Pradesh.</p> <p><b>Q4:</b> Morphological characterization and phylogenetic estimation will be made from the samples.</p>
2.	<p><b>Bryo-flora of Jharkhand.</b></p> <p>Dr. D. Singh, Scientist-D</p>	2018 – 2022	<p><b>Q1:</b> Literature Survey, documentation and identification from previous collections.</p> <p><b>Q2:</b> Identification: 60–70 specimens will be identified and the micromorphology will be characterized through camera lucida illustrations, microphotography and SEM study of previously collected specimens.</p> <p><b>Q3:</b> Two Field tours: One herbarium/SEM study tour to NRC, Dehradun and one field tour to Dalma Wildlife Sanctuary, Jharkhand (c. 200 sq. km).</p> <p><b>Q4:</b> One field tour to Gautam Budha and Parasnath Wildlife Sancturaries (c. 300 sq. km) and submission of Manuscript.</p>
3.	<p><b>Maintenance and development of Mangrove / Mangrove Associates in AJC Bose Indian Botanic Garden, Howrah</b></p> <p>Dr. S.P. Panda, Scientist-C Dr. B.K. Singh, Bot. Asst. Sri Rahul Deb Barman, Bot. Asst.</p>	Ongoing	<p><b>Q1-Q4:</b> The existing mangrove section along the river Hooghly to be maintained. Few new species to be replaced /introduced, if necessary. The mortality rate of the mangrove species to be recorded.</p>
4.	<p><b>Development and Maintenance of aquatic plant section in AJCBIBG</b></p> <p>Dr Devendra Singh, Scientist D Dr. S.P. Panda, Scientist-C Dr. R. Saravanan, Botanist Ms. Titir Saha, Bot. Assistant</p>	Ongoing	<p><b>Q1 – Q4:</b> A circular pool measuring to 30 ft. diam.te be constructed. About 50 Nymphaea and all the Nelumbo of AJCBIBG will be introduced in the said section. Victoria amazonica and V. cruziana will also be introduced in this section.</p>
5.	<p><b>Curatorial work in the Garden and Maintenance</b></p> <p>Dr Devendra Singh, Scientist D</p>	Ongoing	<p><b>Q1:</b> Development of an Orchidarium in AJCBIBG through collection, introduction and ex-situ</p>

	Dr. S.P. Panda, Scientist-C Dr. R. Saravanan, Botanist Ms. Titir Saha, Bot. Assistant Dr. Arvind Parihar, Bot. Assistant Sri Arjun S.K., Bot. Assistant		conservation of the orchids of Eastern Ghats of India. <b>Q2:</b> Development of a section for succulent plants (cacti). <b>Q3:</b> Maintenance of Rosarium in AJCBIBG, Howrah. <b>Q4:</b> Woodland development in AJCBIBG (Indigenous species will be introduced in the garden).Development and maintenance of nursery of Palms, woody plants, endemic trees (at least 30 species with minimum of 500 seedlings of each species).
<b>ANDAMAN &amp; NICOBAR REGIONAL CENTRE, PORT BLAIR</b>			
6.	<b>Revision of the family Musaceae in Andaman and Nicobar Islands along with population assessment.</b>  Dr. Lal Ji Singh, Scientist-E Mr. Gautam Anuj Ekka, Sr. Pres. Assistant	2020 – 2022	<b>Q1:</b> Literature survey and consultation of herbarium. <b>Q2:</b> Literature survey and consultation of herbarium. <b>Q3:</b> One field tour to be undertaken to South Andaman Islands and compilation and finalization of report. <b>Q4:</b> Compilation and submission of final report.
7.	<b>Conservation Assessment, ENM studies including GIS mapping of Endemic trees of Andaman &amp; Nicobar Islands (at least 50 trees species)</b>  Dr. Chandan Singh Purohit, Scientist-C Dr. Lal Ji Singh, Scientist-E Dr. Vivek C.P., Bot. Asstt. Shri Bishnu Charan Dey, Bot. Asstt. <i>New Project</i>	2021-2023	<b>Q1:</b> Literature survey and documentation. <b>Q2:</b> Literature survey and documentation. <b>Q3:</b> One Field tour to Middle Andaman and processing & identification of Herbarium specimens collected in the previous tour <b>Q4:</b> One field tour to Little Andaman
8.	<b>Curatorial work at Botanic Garden:</b> (Multiplication and nursery development of Bamboos, Palms, Zingibers, endemic tree species) of Andaman & Nicobar Islands at Dhanikhari Exp. Garden cum Arboretum and raise nursery.  Dr. Chandan Singh Purohit, Scientist-C Dr. Vivek C. P., Botanical Assistant	2019 – 2022	<b>Q1 – Q4:</b> Development and maintenance of nursery of 30 species with minimum 500 seedlings each species. Recording of flowering and fruiting and mortality rate of tree species of Dhanikhari Experimental Garden cum Arboretum (DEGCA), Nayashahar, South Andaman.
<b>ARUNACHAL PRADESH REGIONAL CENTRE, ITANAGAR</b>			
9.	<b>Enumeration of EET specimens of Arunachal Pradesh</b>  Dr. Krishna Chowlu, Scientist-C	2020-2022	<b>Q1:</b> To study the literature available in ARUN & SFRI, Itanagar. <b>Q2:</b> To study the literature available in ARUN & SFRI, Itanagar. Inventorisation and documentation of earlier

			collections. Study of herbarium materials of ARUN & SFRI, Itanagar. <b>Q3:</b> One field tour to Anjaw, Lohit and Namsai districts of Arunachal Pradesh <b>Q4:</b> To study the literature available in ARUN & SFRI, Itanagar. Inventorisation and documentation of earlier collections. Study of herbarium materials of ARUN & ASSAM, Itanagar.
10.	<b>Floristic studies in selected High Altitude Wetlands (HAWs) and its environs representing 5 districts of Arunachal Pradesh</b>  Dr. M. R. Debta, Scientist-C	2020 – 2023	<b>Q1:</b> Literature survey of study areas. <b>Q2:</b> Literature survey, investigation on major wetlands in the study area and preparation of Checklist. <b>Q3:</b> One Herbarium consultation tour to ASSAM, Shillong; literature survey; investigation on major wetlands in the study area and preparation of Checklist. <b>Q4:</b> Analysis of all information and finalization of Checklist based on secondary data.
11.	<b>Curatorial work at Botanic Garden of ERC, Itanagar</b>  Dr Ranjit Daimary, Botanist	Ongoing	<b>Q1-Q4:</b> Maintenance of economically important, endemic and threatened plants of Arunachal Pradesh at Botanical Garden, BSI, APRC, Itanagar. He will prepare the list of live plants that are found in the garden and submit the report .
ARID ZONE REGIONAL CENTRE, JODHPUR			
12.	<b>Flora of Mount Abu Wildlife Sanctuary, Rajasthan(2021-23)</b>  Dr. Sanjay Mishra, Sci-C & Dr. S. L Meena, Scientist-E <i>New Project</i>	2021-2023	<b>Q1:</b> Literature collection & Regional herbarium consultation. <b>Q2:</b> Literature collection & Regional herbarium consultation <b>Q3:</b> One field tour. Identification and documentation of collected plants. <b>Q4:</b> One field tour and collection of Plant species
13.	<b>Curatorial work at Botanic Garden of AZRC, Jodhpur</b>  Dr. S.L. Meena Dr. Sanjay Mishra, Scientist-C	Ongoing	<b>Q1 – Q4:</b> Maintenance and conservation economically important Endemic and threatened species of the Arid region in the experimental Garden of AZRC.
14.	<b>Curatorial work at Herbarium and digitization of herbarium specimens</b>  Dr. M. K. Singhadiya, Botanist & The Head of Office, AZRC	Ongoing	<b>Q1 – Q4:</b> Preparation of metadata of herbarium specimens of BSJO.

	Sri Ravi Prasad, Bot. Asstt. and Shri Ramesh Kumar, Bot. Asstt.		<b>Q1 – Q4:</b> Identification of at least 1000 unidentified specimen's identification and incorporation in each quarter.
<b>BOTANIC GARDEN OF INDIAN REPUBLIC, NOIDA</b>			
15.	<b>Mass germination and multiplication of Horticultural and ornamental plants/ season flowers in BGIR.</b>  Dr. Sandeep Kr. Chauhan, Scientist –E Dr C.M. Sabapathy, Botanist	<b>Ongoing</b>	<b>Q1 – Q4:</b> Establishment of about 300 medicinal plants germplasm centre in BGIR for displays and awareness. Bar -coding for endemic plants in different plant sections of BGIR. Overall maintenance and development of different Horticulture landscape sections of BGIR Threatened Plant sps., collections from different Regional centres of the BSI Regional Circles, Botanic Gardens, Forest Dept., and their introduction and conservation in BGIR Noida. Setting up Seed Bank Laboratory and Tissue Culture laboratory in BGIR vis a vis seed germination studies on scientific and conventional ways. Setting of Plant Conservatories and their management. Bio-composting /Vermi-compost development at BGIR and revamping thereof.
16.	<b>Establishment and enrichment of existing Forest Types and Proposed Phyto-biodiversity region (4) of India at BGIR Noida (Zones 1-4) by introduction of plant sps., based on respective forest types and phyto-diversity region.</b>  Dr. Sheo Kumar, Scientist E Ms Priyanka Rana , Botanical Asst.	<b>Ongoing</b>	<b>Q1 – Q4:</b> All periphery region of BGIR along the Boundary wall and Near Water Body primarily as per the Master Landscape Plan. BGIR is developing only 8 forest types and 8 Phyto- biodiversity region. Establishment of Taxonomic Botanic Garden at BGIR Noida. Preparation of Database of endemic trees, medicinal, fruit and endemic plants planted in BGIR Noida. Plant sps., collections from different parts of the BSI Regional Circles, Botanic Gardens, Forest Dept. to BGIR Noida. Plant labelling in forest arboretum (EPS and Medicinal Plant sections only). Identification, Selection and collection of Trees for Month wise Bloom for entire areas of BGIR Noida.
17.	<b>Curatorial Practice in Garden and Herbarium</b> Dr. Sheo Kumar, Scientist E	<b>Ongoing</b>	<b>Q1 – Q4:</b> Germination and multiplication of existing endemic trees as well as threatened plants, aquatic plants

			in BGIR Noida to enhance the gemrplasm collection in BGIR for reintroduction. Re - Strengthening of Herbarium facilities in BGIR, with a emphasis of Plant specimen collections, processing and digitalization.
18.	<p><b>Establishment and enrichment of existing Forest Types and Proposed Phytodiversity at BGIR Noida (zone 5,6,7,8) by introduction of plant spp., based on respective forest types and phyto-diversity region, Development of Sacred Section</b></p> <p>Dr.Priyanka Ingle, Scientist-C Ms L.I Chanu, Botanist</p>	<b>Ongoing</b>	<p><b>Q1 – Q4:</b> Establishment of 21 Thematic Botanic Garden sections in BGIR Noida. Precision Phenological Studies and preparation of Database of endemic trees, medicinal, fruit and endemic plants planted in BGIR Noida. Mass scale germination and Multiplication of cactus and succulents in BGIR Noida Plant spp., collections from different parts of the BSI Regional Circles, Botanic Gardens, Forest Dept., to BGIR Noida. Plant specimen collections Herbarium for strengthening at BGIR. Plant labelling in forest arboretum (Forest types 1 to 8) cactus and Succulent section.</p>
<b>CENTRAL BOTANICAL LABORATORY, HOWRAH</b>			
19.	<p><b>Study of Micro-Algae and monitoring of water quality of Sadir Lake of AJCB IBG</b></p> <p>Dr. (Mrs.) Pratibha Gupta, Scientist-E</p>	<p>2019 – 2020</p> <p><i>(Extended upto 2021)</i></p>	<p><b>Q1 – Q4:</b> The final report of the project to be compiled and submitted in March, 2022.</p> <p>Note: No further extension will be given.</p>
20.	<p><b>Anti-nutritional properties, genotoxicity, DNA damage preventive activity, HPLC studies for vitamin and phenolics content.</b></p> <p>Dr. Tapan Seal, Scientist-D Kausik Chaudhuri and Mrs. Basundhara Pillai, Botanist</p>	2018 – 2022	<p><b>Q1 – Q4:</b> 45 Wild Edible Plants of North East India to be studied. The final report of the project to be compiled and submitted in March, 2022.</p>
<b>CENTRAL NATIONAL HERBARIUM, HOWRAH</b>			
21.	<p><b>Algal Flora of Purbasthali Wetland, Bardhaman, WestBengal</b></p> <p>Dr. R.K. Gupta, Scientist-E</p>	2020–2023	<p><b>Q1:</b> Literature survey, identification, illustration, microphotography of previously collected specimens.</p> <p><b>Q2:</b> One field tour to Purbasthali wetland and limnological data to be recorded. Diatoms sample will be studied under SEM and Nikon Microscope.</p>

			<p><b>Q3:</b> Identification and illustration of Blue Green Algae.</p> <p><b>Q4:</b> One field tour to Purbasthali wetland and limnological data to be recorded for all the collection site. Identification and illustration of the members of Chlorophyceae.</p>
22.	<p><b>Revision of the genus <i>Gastrochilus</i> (Orchidaceae) in India.</b></p> <p>Dr. Avishek Bhattacharjee, Scientist-C</p>	2018 – 2021 (Extended upto March 2022)	<p><b>Q1:</b> Literature survey, documentation and identification of previous collections.</p> <p><b>Q2:</b> Literature survey, documentation and identification of previous collections.</p> <p><b>Q3:</b> Two field-cum-herbarium consultation tours in Eastern Himalaya and N.E. India to collect targeted species and to consult herbarium specimens at ASSAM, Orchid Herbarium Tipi, herbarium of the University of North Bengal.</p> <p><b>Q4:</b> Preparation of description, photo-plates of different taxa under the genus collected specimens and submission of Report.</p>
23.	<p><b>Digitization of all the species belonging to the family Balsaminaceae and updation of Family Balsaminaceae in e-flora of India</b></p> <p>Dr Kumar Avinash Bharati, Scientist-C and Dr Anand Kumar, Botanist <i>New Project</i></p>	2021-2022	<p><b>Q1 – Q4:</b> All the specimens belonging to the family Balsaminaceae deposited at CAL will be digitized. Updation of Family Balsaminaceae in e-flora of India</p>
24.	<p><b>Plant diversity in Sacred Grooves of South Bengal</b></p> <p>Dr Kumar Avinash Bharati, Scientist-C <i>New Project</i></p>	2021-2023	<p><b>Q1 – Q3:</b> Literature survey and documentation.</p> <p><b>Q4:</b> One field tour to be taken selected sacred grooves of South Bengal.</p>
CENTRAL REGIONAL CENTRE, ALLAHABAD			
25.	<p><b>Curatorial work and maintenance of the RET and economically important species in the experimental garden of BSI CRC, Allahabad.</b></p> <p>Dr. Arti Garg, Scientist E Dr. Brijesh Kumar, Botanist Dr. A.K. Verma, Sci. C Dr. Saurabh Sachan, Bot. Asstt.</p>	Ongoing	<p><b>Q1 – Q4:</b> Regular maintenance of the garden. Introduction of 10 RET species in the garden. Collection and introduction of RET/medicinal plants to different areas of Central India for plant collection. Plants to be collected during routine tours</p>
26.	<p><b>Flora of Samaspur Ramsar Site, Raebareli, U.P. (799.4 hectare)</b></p> <p>Dr. Arti Garg, Scientist E Dr. Nitisha Srivastava, Bot. Asstt. <i>New Project</i></p>	2021-2022	<p><b>Q1:</b> Mapping and literature consultation.</p> <p><b>Q2:</b> One field tour. Identification and documentation of specimens collected.</p> <p><b>Q3:</b> One field tour to the area. Identification and documentation of specimens collected.</p>

			<b>Q4:</b> Finalisation and submission of Report.
27.	<b>Flora of Kunu National Park, Madhya Pradesh (344 sq km)</b>  Dr. A.K. Verma, Scientist C <i>New Project</i>	<b>2021-2023</b>	<b>Q1-Q2:</b> Literature consultation and mapping. <b>Q3:</b> One field tour to the area. Identification of plants collected. <b>Q4:</b> One field tour to the area and Identification and documentation of specimens collected.
<b>DECCAN REGIONAL CENTRE, HYDERABAD</b>			
28.	<b>Flora of Manjeera Wild Life Sanctuary, Telangana. (Area: 20 km<sup>2</sup>)</b>  Dr. L. Rasingam, Scientist-D	2017 – 2022	<b>Q1:</b> Identification and documentation of earlier collection. <b>Q2:</b> Identification and documentation of earlier collection. <b>Q3:</b> One field tour. <b>Q4:</b> One field tour. Finalisation and submission of manuscript.
29.	<b>Grasses of Telangana State, India</b>  Dr. S. Nagaraju, Botanical Assistant	2017 – 2022	<b>Q1:</b> Identification and inventorisation of specimens collected in earlier tours. <b>Q2:</b> Identification and inventorisation of specimens collected in earlier tours. <b>Q3:</b> One field tour. <b>Q4:</b> Identification and inventorisation of specimens collected in earlier tours. Finalisation and submission of manuscript.
30.	<b>Curatorial work at herbarium and Museum of DRC, Hyderabad</b>  Dr. G. Swarnalatha, Bot. Asstt. Dr. Ravi Kiran, Bot. Asstt.	<b>Ongoing</b>	<b>Q1-Q4:</b> Digitization and development of Database of Herbarium specimen (Dr. Ravi Kiran, Botanical Assistant)  <b>Q1-Q4:</b> Development of Museum of DRC, Hyderabad. (Dr. G. Swarnalatha, Botanical Assistant)
31.	<b>Flora of Kinnerasani Wild life Sanctuary, Telangana (Area: 635.40 km<sup>2</sup>)</b>  Dr. J. Swamy, Botanical Assistant	2017 – 2022	<b>Q1:</b> Identification and inventorisation of specimens collected in earlier tours. <b>Q2:</b> Identification and documentation of specimens. <b>Q3:</b> One field tours to the unexplored areas of the sanctuary. Identification of collected specimens. <b>Q4:</b> One field tour to the unexplored areas of the sanctuary. Identification of collected specimens. Finalisation and submission of manuscript.
<b>EASTERN REGIONAL CENTRE, SHILLONG</b>			
32.	<b>Flora of Nagaland (Vol. 1 &amp; Vol. 2).</b> Dr. N. Odyuo, Scientist – E	2016 – 2021	<b>Q1-Q4:</b> The manuscript to be submitted in march 2022: Then



	Dr. Chaya Deori, Scientist-E Dr. David Lalsama Baite, Scientist C Dr. S.R. Talukdar, Bot. Assistant (under guidance of Dr. A. A. Mao) Vol. I: Ranunculaceae to Asteraceae (Approx. 1500 taxa) by March 2020. Vol. II & III: Campanulaceae to Ceratophyllaceae and Hydrocharitaceae to Poaceae (Approx. 1500 taxa) by March 2021	To be submitted by March 2022	the rest of the work to be taken as separate Project. No extension is allowed.
33.	<b>Micropropagation of EET Plants of North East India in ERC, Shillong.</b>  Dr. Deepu Vijayan, Scientist - C	<b>Ongoing</b>	<b>Q1 – Q4:</b> To standardize the protocol, mass multiplication of EET plants of Northeast India namely Eriodes barbata (Lindl.) Rolfe, Pholidota katakiana Phukan and Micropera rostrata (Roxb.) N.P. Balakr. Maintenance of in vitro raised plants of Armadorum senapatianum and Cymbidium tigrinum in plant tissue culture, garden and polyhouse.
34.	<b>Herbaceous flora of Meghalaya (volume 2)</b>  Dr. Chaya Deori, Scientist-E <i>New project</i>	2021-2022	<b>Q1 – Q4:</b> Editing and submission of updated manuscript of Herbaceous flora of Meghalaya Vol. 2.
35.	<b>Flora of Manipur Vol 2</b>  Shri B. B. T. Tham, Botanist Shri. Harminder Singh, Bot. Asst. and Sri L.R. Meitei, Bot. Asst. <i>New project</i>	2021-2023	<b>Q1:</b> Documentation of Plants from Herbarium <b>Q2:</b> Documentation of Plants from Herbarium <b>Q3:</b> One Field tour <b>Q4:</b> Identification & Documentation.
36.	<b>Curatorial works and maintenance of the Experimental Botanic Garden, BSI, ERC, Barapani</b>  Mr. B.B.T. Tham, Botanist and Shri L.R. Meitei, Bot. Asst.	<b>Ongoing</b>	<b>Q1:</b> Maintenance of the endemic, rare, threatened and economically important plants of India. <b>Q2:</b> Analysis of the phenological data and mortality rate of already collected from EBG, Barapani. <b>Q3:</b> Introduction of at least 30 Threatened plant species and raising of seedling at least 500 of each species. <b>Q4:</b> Two local field tours.
37.	<b>Curatorial works at Herbarium of SRC, Shillong (ASSAM)</b>  Smt. Nandita Sarma, Bot. Asst. Miss. Kankana Chakraborty, Bot. Asst. Shri. Vijay, Bot. Asst. Miss. Debala Tudu, Bot. Asst.	<b>Ongoing</b>	<b>Q1 - Q4:</b> Regular maintenance of herbarium Preparation of database and incorporation of metadata of all digitised herbarium specimens. Digitization of herbarium specimen of ASSAM. Target: 16,000 herbarium specimens.
<b>HIGH ALTITUDE WESTERN HIMALAYAN REGIONAL CENTRE, SHOLAN</b>			
38.	<b>Floristic diversity of Dr. Y.S. Parmar University Campus, Nauni, Solan, Himachal</b>	2021 – 2022	<b>Q1:</b> Listing of plant species from literature.

	<p><b>Pradesh.</b></p> <p>Dr. Kumar Ambrish, Scientist-E and Dr. K.S. Dogra, Scientist-D <i>New Project</i></p>		<p><b>Q2:</b> Collection of plant species from the campus and digital photography.</p> <p><b>Q3:</b> Collection of plant species from the campus and digital photography.</p> <p><b>Q4:</b> Finalization and submission of manuscript.</p>
NORTHERN REGIONAL CENTRE, DEHRADUN			
39.	<p><b>In vitro mass multiplication and propagation and rehabilitation in natural habitat of useful and threatened species of the North-West Himalaya.</b></p> <p>Dr. Giriraj Singh Panwar, Scientist-D and Dr. Bhavana Joshi, Botanist</p> <ol style="list-style-type: none"> <li>1. <i>Malaxis acuminata</i> D.Don.(Orchidaceae)</li> <li>2. <i>Dendrobium crepidatum</i> Lindl.&amp; Paxton(Orchidaceae)</li> <li>3. <i>Delphinium denudatum</i> Wall. ExHook.f. &amp; Thomson(Ranunculaceae)</li> <li>4. <i>Cyathea spinulosa</i> Wall. ex Hook. ( Cyatheaceae)</li> <li>5. <i>Malaxis muscifera</i> (Lindl.)Kuntze (Orchidaceae)</li> <li>6. <i>Platanthera edgeworthii</i> (Hook.f.ex Collett) R. K. Gupta(Orchidaceae)</li> <li>7. <i>Magnolia kisopa</i> (Buch.-Ham. exDC.) Figlar ( Magnoliaceae )</li> <li>8. <i>Zanthoxylum armatum</i> DC.(Rutaceae)</li> </ol> <p>Besides mass multiplication of <i>Trachycarpus takil</i> Becc. (Arecaceae), <i>Selaginella adunca</i> A.Braun ex Hieron. ( Selaginellaceae) and <i>Dalbergia latifolia</i> Roxb. Leguminosae ) will be undertaken</p>	2020 – 2023	<p><b>Q1:</b> Collection of seeds/ explants from the wild. In vitro germination of the seeds.</p> <p><b>Q2:</b> Optimization of sterilizing agents for different explants. Screening of tissue culture medium for different explants of selected species.</p> <p><b>Q3:</b> Screening of plant growth regulators for direct and indirect organogenesis in different explants of the selected species.</p> <p><b>Q4:</b> Proliferation of cultures in the optimal medium and PGRs concentrations. Hardening of the in vitro regenerated plantlets.</p> <p>Dr. Bhavana Joshi will also work in Herbarium as and when required and as directed by Scientist-in-charge.</p>
40.	<p><b>Ethnobotanical study of Tharu and Bhoja tribe of Uttarakhand, India.</b></p> <p>Dr. Harish Singh, Scientist-E</p>	2020 – 2023	<p><b>Q1:</b> Identification, documentation of earlier collections.</p> <p><b>Q2:</b> Identification, documentation of earlier collections.</p> <p><b>Q3:</b> One field tour to Udham Singh Nagar district. Collection of ethno-botanical information following the established (2020-2023) procedures. Processing of herbarium specimens, identification, documentation and compilation of data collected in previous quarter depending upon budget allocation.</p>

			<b>Q4:</b> Identification, documentation and compilation of data collected in earlier tours.
41.	<p><b>Taxonomic revision of genus <i>Taraxacum</i> F.H.Wigg. in India</b></p> <p>Dr. Sameer Patil, Botanist &amp; Dr. S.K. Singh, Scientist E</p>	2020 –2023	<p><b>Q1:</b> SEM study of achenes of collected species and obtained from duplicate herbarium.</p> <p><b>Q2:</b> SEM study of achenes of collected species and obtained from duplicate herbarium.</p> <p><b>Q3:</b> One herbarium consultation tour to Forest Research Institute and Punjabi University/Jammu University.</p> <p><b>Q4:</b> One field tour. Documentation of 30 species. One field tour. Documentation of 30 species.</p>
42.	<p><b>Assessment of Plant diversity in Rajaji National Park, Uttarakhand.</b></p> <p>Dr. Puneet Kumar, Scientist-C, Dr. S.K. Singh, Scientist-E Dr. P.K. Deroliya, Bot. Asst. &amp; Poulami Ghosh, Bot. Asst.</p> <p><i>New Project</i></p>	2021 –2024	<p><b>Q1:</b> Literature survey and collection of reference and herbarium consultation.</p> <p><b>Q2:</b> Literature survey and collection of reference and herbarium consultation.</p> <p><b>Q3:</b> One Field Tour to Rajaji National Park, collection and identification of specimens.</p> <p><b>Q4:</b> One Field Tour to Rajaji National Park Identification of specimens continued; Description of identified species.</p>
43.	<p><b>Backlog clearance of unidentified Herbarium sheets at BSD.</b></p> <p>Dr. S.K Singh Scientist E, Subhasmit Bhattacharyya, Bot. Asstt., Poulami Ghosh, Bot. Asst., Latika Sagarwal, Bot. Asstt.</p>	<b>Ongoing</b>	<p><b>Q1:</b> Segregation of herbarium sheets. Collecting the field related information whose field books are not available. Data entry of herbarium sheets. Identification of 600 plants. Fumigation &amp; incorporation of identified sheets.</p> <p><b>Q2:</b> Identification of 800 plants fumigation &amp; incorporation of them.</p> <p><b>Q3:</b> Identification of 800 plants fumigation &amp; incorporation of them.</p> <p><b>Q4:</b> Identification of 800 plants &amp; fumigation &amp; incorporation of them. Preparation &amp; submission of final report.</p>
44.	<p><b>Curatorial works and maintenance of the garden of NRC, Dehradun.</b></p> <p>Dr. S.K. Singh, Scientist E, Dr. Puneet Kumar, Scientist-C and Dr. P.K. Deroliya Bot. Asst.</p>	<b>Ongoing</b>	<b>Q1-Q4:</b> Regular maintenance and conservation of the of endemic threatened and economic plant species in the garden of NRC. Documentation of monthly data on flowering and fruiting. At least 10 species will be added to the garden under ex-situ programme.

45.	<b>Development of Medicinal Plant Garden</b>  Dr. Harish Singh, Scientist-‘E’ <i>New project</i>	2021-2023	<b>Q1-Q4:</b> Development of a thematic medicinal plants section of in NRC Experimental garden. Selection of species may be on consultation with Scientist In-charge, NRC BSINRC.
SIKKIM HIMALAYAN REGIONAL CENTRE, GANGTOK			
46.	<b>Curatorial works and maintenance of Germplasm of <i>Rhododendron</i> L. (Ericaceae) and <i>Impatiens</i> Riv ex L. (Balsaminaceae) in EBG, BSI-SHRC.</b>  Dr. Rajib Gogoi, Scientist E Dr. J. H. Franklin Benjamin, Scientist C	Ongoing	<b>Q1 – Q4:</b> Collection and maintenance of <i>Rhododendron</i> L. (Ericaceae) and <i>Impatiens</i> Riv ex L. (Balsaminaceae) in Experimental Botanic Gardens, Gangtok.
47.	<b>Wild edible plants of Sikkim and Darjeeling Himalaya.</b>  Dr. Rajib Gogoi, Scientist E Dr. J. H. Franklin Benjamin, Scientist C <i>New Project</i>	2021-2023	<b>Q1:</b> Digitization and Herbarium database. <b>Q2:</b> Digitization and Herbarium database. <b>Q3:</b> Data entry of all literature related to wild edible plants of Sikkim <b>Q4:</b> One field tour in Q4 in Sikkim and Darjeeling Himalaya.
SOUTHERN REGIONAL CENTRE, COIMBATORE			
48.	<b>FLORA OF TAMIL NADU (1-7 Vols.)</b> <b>Vol. 1.</b> Dr. W. Arisdason, Mrs. Ananthalakshmi & Ranunculaceae to Cornaceae (73 Fam.) <b>[320 genera &amp; 842 spp.]</b>  <b>Vol. 2.</b> Dr. K. A. Sujana & Shri Rakesh Fabaceae to Sambucaceae (36 Fam.) <b>[264 genera &amp; 905 spp.]</b>  <b>Vol. 3.</b> Dr. C. Murugan Dr. M. Murugesan & Dr. S. Arumugam Rubiaceae to Gentianaceae (26 Fam.) <b>[275 genera &amp; 871 spp.]</b>  <b>Vol. 4.</b> Dr. V. Sampath Kumar Dr. R. K. Singh & Mrs. Lydia Thomas Menyanthaceae to Lamiaceae (19 Fam.) <b>[224 genera &amp; 812 spp.]</b>  <b>Vol 5.</b> Dr. R. Manikandan Mrs. Mehala Devi, R, Plantaginaceae to	2021-2024	Vol. 1. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp.  Vol. 2. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp.  Vol. 3. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp.  Vol. 4. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp.

	<p>Ceratophyllaceae (33 Fam.) [191 genera &amp; 648 spp.]</p> <p><b>Vol 6.</b> Dr. M.U. Sharief, Scientist-E Dr. S. S. Hameed, Dr. V. Sampathkumar, Dr. Arisdason &amp; Dr. M. Murugesan Hydrocharitaceae to Eriocaulaceae (39 Fam.) [210 genera &amp; 567 spp.]</p> <p><b>Vol 7.</b> Dr. C. Murugan Dr. A. A. Kabeer (CBL/BSI) &amp; Dr. S. Arumugam Cyperaceae &amp; Poaceae (2 Fam.) [152 genera &amp; 652 spp.] <i>New Project</i></p>		<p>Vol 5. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp.</p> <p>Vol 6. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp.</p> <p>Vol 7. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp.</p>
49.	<p><b>Curatorial works and maintenance of the National Orchidarium and Experimental Garden (NOEG), Yercaud, associated with SRC, Coimbatore</b></p> <p>Dr. S. Kaliamoorthy, Scientist-E &amp; Dr. T.S.Saravanam, Botanical Asst.</p>	<b>Ongoing</b>	<p><b>Q1:</b> Maintenance and conservation of the Endemic, Endangered and Threatened Plants (Orchids, Medicinal, Economic Important and Ornamental Plants).</p> <p><b>Q2:</b> Multiplication and Maintenance of existing orchid collections, and other plants of the garden. Recording of phenology of orchids and other angiosperms present in the garden.</p> <p><b>Q3:</b> One field visit to Wayanad district, Kerala for survey and live plant collection. Multiplication and Maintenance of existing orchid collections, and other plants of the garden. Recording of phenology of orchids and other angiosperms present in the garden. Field visit to Wayanad district, Kerala for survey and live plant collection.</p> <p><b>Q4:</b> Multiplication and Maintenance of existing orchid collections, and other plants of the garden. Recording of phenology of orchids and other angiosperms present in the garden.</p>
50.	<p><b>Flora of Kerala</b> Vol. 3 by Dr. C. Murugan Vol. 4 by Dr. K. Sujana Vol. 5 by Dr. M.U. Sharief Vol. 6 by Dr. M. Murugesan</p>	2020 – 2022 (No extension will be allowed)	<b>Q1 – Q4:</b> Updation and Editing, Compilation and Submission of manuscript of Flora of Kerala.
WESTERN REGIONAL CENTRE, PUNE			

51.	<b>Phyto-Database of Konkan (Maharashtra).</b>  Dr. Prashant K. Pusalkar, Scientist-E	2020-2023	<b>Q1:</b> Data compilation of Phyto-Diversity of Konkan – Herbarium and Literature. <b>Q2:</b> Data compilation of Phyto-Diversity of Konkan – Herbarium and Literature. <b>Q3:</b> One field tour to Konkan, Maharashtra. Phyto-Data basing of selected and unique Phyto-diversity rich habitats and ecosystems. <b>Q4:</b> One field tour to Konkan, Maharashtra. Data compilation of Phyto-resources (Wild edibles, wild germplasm, Ethnomedicines, Economic and useful plants, etc.)
52.	<b>Bambusicolous Fungi of Goa.</b>  Dr. Rashmi Dubey, Scientist-E	2020-2024	<b>Q1:</b> Collection of literature from different sources. <b>Q2:</b> Collection of literature from different sources. <b>Q3:</b> One Field tour to Bhagwan Mahaveer WLS and Mollem National Park (Goa) and their adjoining areas for collection samples of Bambusicolous fungi. One Herbarium Consultation tour to Indian Institute of Science, Bangalore <b>Q4:</b> One Field tour to Mahadei WLS, Bondla Wildlife Sanctuary(Goa) and their adjoining areas for collection samples of Bambusicolous fungi
53.	<b>Curatorial works and maintenance of the Herbarium of BSI, Pune</b>  Dr. A. Benniamin, Scientist E and team	<b>Ongoing</b>	<b>Q1 – Q4:</b> Preparation of database and incorporation of metadata. Digitization of herbarium specimens. Regular maintenance of herbarium.
54.	<b>Supplement to the Flora of Maharashtra</b>  Dr. M. Y. Kamble, Scientist E <i>New Project</i>	2021- December 2022	<b>Q1 – Q4:</b> Compilation of species as supplemented to the existing flora of Maharashtra.
55.	<b>Curatorial works and maintenance of the Botanic Garden of BSI, Pune</b>  Dr. C.R. Jadhav, Botanist & Shri B.P. Kadam, Bot. Asstt. Dr. Prashant K. Pusalkar, Sc. E & Madhuri Pawar, Bot. Asstt	<b>Ongoing</b>	<b>Q1 – Q4:</b> Preparation of database on live plants of garden (real time data). Maintenance and development of Phytodiversity section of Konkan and adjoining areas of Western Ghats
INDUSTRIAL SECTION INDIA MUSEUM, KOLKATA			
56.	<b>Documentation of exhibits and</b>	2020 – 2022	<b>Q1 – Q4:</b> Catalogue of exhibits and

	<b>materials of Botanical Gallery in Industrial Section, Indian Museum.</b> Dr. S. Dutta, Bot. Asst. Dr. K. Pagag, Botanist and Dr M. Bhaumik, Scientist -E		materials of Botanical Gallery in Industrial Section, Indian Museum.
PUBLICATION DIVISION, HEADQUARTERS			
57.	<b>Flora of Eagle Nest Wild Life Sanctuary and its adjacent regions, West Kameng District, Arunachal Pradesh.</b>  Sri Sanjay Kumar Botanist Dr. S. S. Dash, Scientist -E	2019 – 2022 ( <i>Extended up to 2023 due to Covid 19</i> )	<b>Q1:</b> Processing and identification of Herbarium specimens collected earlier. <b>Q2:</b> Description of 75 plant species to be completed. <b>Q3:</b> One Field tour to study area (subject to Corona pandemic situation). <b>Q4:</b> Processing, identification and inventorisation of collected specimens.
58.	<b>Red listing of Indian endemics as per IUCN criteria: Family Ranunculaceae</b>  Dr. A.N. Shukla, Sci. C., Dr. Debasmitta Dutta Pramanick, Sci. C., Dr. D.K. Agrawala, Sci. D, Dr. J.S. Jalal, Sc. E & Dr. S.S. Dash, Sc.-E <i>New Project</i>	2021 - 2023	<b>Q1 – Q4:</b> Literature survey, data collection and compilation. Preparation of taxon data sheet and entry of distribution data in the excel sheet for assigning geo-coordinates.
TECHNICAL DIVISION, HEADQUARTERS			
59.	<b>Marine Macro Algal Flora of West Bengal Coast, India.</b>  Dr. S. K. Yadav, Botanist Sri Kaju Majumdar, Pres. Asstt.	2019 – 2022	<b>Q1:</b> Literature survey, Identification and description writing of collected specimens. <b>Q2:</b> Literature survey, Identification and description writing of collected specimens. <b>Q3:</b> One field tour. Literature survey, description writing of collected specimens. Study of algal herbarium specimens at ISIM / CNH. <b>Q4:</b> Manuscript writing, finalization and submission of final report.
60.	<b>Plants of Kolkata</b>  Dr. S. S. Dash, Scientist -E Dr. R. K. Chakraborty, Retd. Sci. Dr. A. A. Mao, Director Dr. Umeshkumar L. Tiwari, Scientist-C (with assistance of Ms. Sinchita Biswas, Bot. Asst.) <i>New Project</i>	2021 – 2023	<b>Q1 – Q4:</b> Compilation and submission of the manuscript in the form of A Handbook on Plants of Kolkata.
61.	<b>Wild useful/edible plants of Arunachal Pradesh</b>  Dr. Umeshkumar L. Tiwari,	2021 – 2023.	<b>Q1:</b> Preparation of Check list of edible plant of Arunachal Pradesh <b>Q2:</b> Literature survey and Documentation of edible plant of

	<p>Scientist-C,  Dr. S.S. Dash, Scientist-E;  Dr. K. Chowlu, Scientist-C and  Dr. Ranjit Daimary, Botanist  <i>New Project</i></p>		<p>Arunachala Pradesh  <b>Q3:</b> Tour to (Anjaw, Lohit, Namsai, Changlang, Tirap and Longding)  <b>Q4:</b> Tour to East Kameng, West Kameng, Tawang, Kurung Kumey, Lower Subansiri, Upper Subansiri and Kra Daadi</p>
--	--	--	--



**ANNUAL RESEARCH PROGRAMME OF BOTANICAL SURVEY OF INDIA ON  
MARINE MACRO ALGAL FLORA OF INDIA (2019 – 22)**

62.	<p><b>Marine Macro Algal flora of India</b></p> <ul style="list-style-type: none"> <li>▪ Dr. M. Palanisamy, Scientist E, CNH, Howrah</li> <li>▪ Dr. S.K. Yadav, Botanist BSI, Hqtrs., Kolkata</li> </ul>	2021-2022	<p><b>Q1 – Q4:</b> Compilation and description writing of Green and Brown Marine Macro Algae (Seaweeds). Dr. M. Palanisamy</p> <p>Compilation and description writing of 150 taxa of Red Marine Macro Algae (Seaweeds). Dr. S.K. Yadav</p>
-----	--	-----------	--

**ANNUAL RESEARCH PROGRAMME OF BOTANICAL SURVEY OF INDIA ON  
PTERIDOPHYTES FLORA OF INDIA (2020 – 23)**

(Vols. I, II, & III)

63.	<p><b>Pteridophytic flora of India.</b> 110 spp.</p> <ul style="list-style-type: none"> <li>▪ Dr. A.Benniamin, Scientist-E, WRC,Pune</li> <li>▪ Dr. Jesubalan, Bot.Asst WRC,Pune</li> </ul>	2021-2022	<p><b>Q1:</b> Study Review of Literature and consultation of herbarium</p> <p><b>Q2:</b> One Herbarium consultation tour MH, Coimbatore.</p> <p><b>Q3:</b> One Herbarium consultation tour ANRC, Portplair.</p> <p><b>Q4:</b> One Herbarium consultation tour APRC and ERC Shillong.</p>
	<p>130 spp.</p> <ul style="list-style-type: none"> <li>▪ Dr B.S.Kholia, Scientist-E, NRC, Dehradun</li> </ul>	2021-2022	<p><b>Q1:</b> Review of literature &amp; description of 20 spp.</p> <p><b>Q2:</b> Review of literature, consultation of DD herbarium and description of 20 spp.</p> <p><b>Q3:</b> Review of literature, consultation of DD herbarium and description of 20 spp. One herbarium cum filed tour to NE India (BSHC, ASSAM, ARUN) (subject to the Pandemic situation)</p> <p><b>Q4:</b> Review of literature, consultation of DD herbarium and description of 20 spp. Note: Dr. Kholia will attend to those species only for which he has proposed in the ARP.</p>
	<p>80 spp.</p> <ul style="list-style-type: none"> <li>▪ Dr. V. K. Rawat, Scientist-E, APRC, Itanagar</li> </ul>	2021-2022	<p><b>Q1:</b> Data collection, compilation &amp; preparation draft Mss(20 spp.)</p> <p><b>Q2:</b> Data collection, compilation &amp; preparation draft Mss(20 spp.)</p> <p><b>Q3:</b> Data collection, compilation &amp; preparation draft Mss(20 spp.)</p> <p><b>Q4:</b> Data collection, compilation &amp; Preparation of Mss(20 spp.)</p>
	<p>80 spp.</p> <ul style="list-style-type: none"> <li>▪ Dr. Brijesh Kumar, Botanist, CRC, Allahabad</li> </ul>	2021-2022	<p><b>Q1:</b> Data collection, compilation &amp; preparation draft mss. (20 spp.)</p> <p><b>Q2:</b> Data collection, compilation &amp; preparation draft mss. (20 spp.) HCT to BSHC, ARUN, ASSAM and field tour to Sikkim.</p> <p><b>Q3:</b> Data collection, compilation</p>

			&preparation draft mss. (20 spp.) HCT to BSD, DD, PAN & PUN <b>Q4:</b> Data collection, compilation & preparation draft mss. (20 spp.) HCT to CAL herbarium
64.	<b>Revision of the Lichen family          Pyrenulaceae in India</b> Dr. T.A.M. Jagadesh Ram Scientist-E, BSI, SRC, Coimbatore	2017 – 2022	<b>Q1:</b> Herbarium consultation tours to BSI, CNH, Howrah; ERC, Shillong; CRC, Allahabad; NBRI, Lucknow. Specimens will be taken on loan. <b>Q2:</b> Loan specimens will be studied morphologically, anatomically and chemically. Identification and preparation of Description. <b>Q3:</b> Loan specimens will be studied morphologically, anatomically and chemically. Identification and preparation of Description. <b>Q4:</b> Herbarium consultation tours to ARI, Pune. Preparation and submission of Manuscript. Total Herbarium Consultation Tour: 02.

#### Summary of Annual Research Projects 2021-2022

<b>No. of new projects starting in 2021-22</b>	<b>: 17</b>
<b>No. of previous projects continuing during 2021-22 and beyond</b>	<b>: 26</b>
<b>No. of ongoing projects</b>	<b>:21</b>
<b>Total number of projects</b>	<b>: 64</b>