NGCPR

Projects Completed

Project 1: Assessment of Threatened Medicinal Plants of Maharashtra – First Conservation Assessment and Management Plan (CAMP) Exercise

Project Duration: 2 days (24th & 25th September 1998)

The first Conservation Assessment and Management Plan (CAMP) exercise on threatened medicinal plants of Maharashtra province, India was held on 24th and 25th September 1998. The Naoroji Godrej Centre for Plant Research (NGCPR) organized this exercise in collaboration with Department of Botany, University of Pune.

Project Summary: Out of 183 species of medicinal plants considered for the CAMP exercise, 26 species belonging to 23 genera and 18 families were considered threatened in the wild, and each species was assigned a threat status. Among the 26 threatened species: - One species is Critically Endangered (CE), - 12 species are Endangered (E), - 13 species are Vulnerable (V). Considering the plant parts used: - 12 species are harvested for their root, - Three species for their leaves, - Three species for their flowers, - Three species for their fruits, - Three species for their seeds, and one species for its bark and root, - One species for its seeds and corms. A comprehensive list of the threatened medicinal plants of Maharashtra has been prepared and published. 64 delegates attended the CAMP exercise from various medical and pharmacy colleges, Universities, NGOs, and Forest Departments. The Exercise also brought to light some lesser-known endangered medicinal plants.

Project 2: Endemic Plants of India (A Status report of Maharashtra State)

Project Duration: 1 year (2000)

Project Summary: The study was aimed to understand the patterns of flowering plants with a special reference to distribution, adaptations, local biodiversity hot spots etc. The study contributed enumeration of 687 endemic plant species with their habit, phenology, and appropriate distribution in Maharashtra. A status report of 87 pages has been published by the NGCPR. **Book Published in August 2000**

Project 3. Thane Creek - A Status Report on species diversity in relation to Conservation and Documentation.

Project Duration: 1 year (2000 to 2001)

Project Summary: Naoroji Godrej Centre for Plant Research (NGCPR) in collaboration with the Soonabai Pirojsha Godrej Foundation studied the diversity and structure of Thane Creek mangrove ecosystem. The study aimed to quantify the diversity and understand the relationships of various groups of organisms in Thane creek mangrove ecosystems. The study documented 16 mangrove species in the Thane Creek area. These were represented by 10 genera and eight families. The study also enumerated about 60 more mangrove associates and salt tolerant species.

Project 4: *Nothapodytes nimmoniana* (Grah.) Mabb. – A Case study of medicinal plant trade in India

Project Duration: 1 year (2002)

Project Summary: *Nothapodytes nimmoniana* is one of the threatened medicinal plants in India and has a rich source of camptothecin (anti-cancerous properties). In recent years because of the enormous demand for several plants worldwide, there has been an indiscriminate extraction of the trees from many parts of India, especially from the Western Ghats, a mega diversity forest range along the western coast of India. The present study addresses global trade of camptothecins and the conservation of one such plant species which is the source of camptothecins viz. *Nothapodytes nimmoniana*. The world sales of camptothecin and its

derivatives have reached the amount of 1.5 billion USD. In conclusion the study suggests: trading the plant effectively, screening closely related species for camptothecin, and systematic harvesting should be done by the Forest department while taking help from Village panchayats.

<u>Project 5:</u> Grading & Trading patterns of *Terminalia chebula* Retz (Haritaki) nuts in the Maharashtra state.

Project Duration: 1 year (2002)

Project Summary: *Terminalia chebula* Retz is one of the important forest trees of India. Collection and trading of Hirda nuts is a major occupation of many tribes of Maharashtra. Nuts are used in various alternative systems of medicine. The nuts also yield commercially valuable Tannins and are used in the leather industry. Hirda nuts from Maharashtra are exported to many other parts within and outside the country. Pakistan and Gulf countries are some of the important regions, which import Hirda nuts. The grading of nuts is based on morphology and color. The studies indicate that more quantitative information, especially chemistry-related grading studies needs to be carried out. The Tribal development corporation plays a pivotal role in controlling prices. The entire structure of TDC is to be revamped to suit global needs and to improve the export potential of hirda nuts. Involvement of the Corporate sector of India in the trading business is important, as the existing method of trading is unorganized and cannot be suitable to compete globally. The study revealed two selections viz. Raireshwar and Devana fetch more money in the commercial trading market because they possess three important grading points: Golden yellow color, long beak, and small seed.

Variation within Hirda fruits

<u>Project 6:</u> Study, Propagation and utilization of local Medicinal plants with antidiarrhoeal activity in the Parinche Valley I in Maharashtra)– the provision of a model.

Project Duration: 2 years (2002- 2004)

Project Summary: An ethnobotanical survey of antidiarrhoeal plants from Parinche Valley towards the documentation and conservation of traditional knowledge has been carried out by NGCPR. Diarrhoeal diseases are the second largest cause of morbidity in rural India. Medicinal plants given by the traditional healers of Parinche in Pune district, Maharashtra are known to be efficacious for many common ailments, including diarrhoeal diseases. Interviews and inquiries were conducted among traditional healers, indigenous communities, and village elders. One hundred and eighty-two plants used by tribes and natives for different ailments were documented of which 28 flowering plants were for diarrhoea. Amongst the 28 plants, the antidiarrhoeal activity of five plants viz., *Caesalpinia sepiaria*, *Dioscorea pentaphylla*, *Launaea pinnatifida*, *Syzygium rubicundum* and *Ziziphus jujuba* has not been reported previously. Two species viz., *Ziziphus xylopyra* and *Syzygium rubicundum* are endemic to India. Parinche valley is an ethnobotanically rich area with abundant availability and knowledge of medicinal plants that can serve as a model for low-cost health care. The result has been published in the Journal of Ethnopharmacology.

<u>Project 7:</u> Preparation of a detailed check list of plants used in antimycobacterial or antitubercular activity.

Project Duration: 3 years (2009 to 2011)

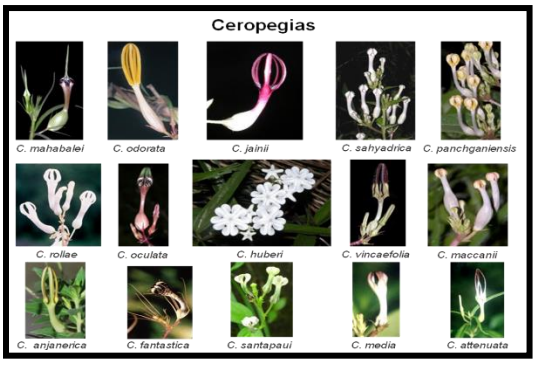
Project Summary: Tuberculosis is a chronic infectious disease caused due to several species of mycobacteria. High prevalence of tuberculosis in recent years is attributed mainly to multi drug resistant strains of mycobacteria and because of acquired human immunodeficiency syndrome (AIDS). And it is a major cause of concern all over the world. As the crisis grows larger naturally various options are looked at either to prevent or to control the disease. Identifying new and effective antimycobacterial agents is the need of the hour. In this regard, plants offer a huge and valuable resource as they are known to produce hundreds of chemicals. Some of them are already used in traditional systems of medicine. The project was envisaged to carry out an intensive

search of all plants that were found in India and reported to be antimycobacterial or antitubercular activity in traditional and modern systems of medicine. The results have been published in the Journal of Complementary and Alternative Medicine.

<u>Project 8:</u> Molecular Systematics, Phylogeny, and Ecology of *Ceropegia* L. (Apocynaceae-Asclepiadoideae) in India.

Project Duration: 3 years (2012-2014: ARI & 2015: NGCPR)

Project Summary: The morphological, molecular and pollination ecological studies of *Ceropegia* species from India has been carried out for their molecular phylogeny and ecological adaptations. The explorations in the Northern Western Ghats, Konkan and its allied region resulted in collection and study of twenty-seven *Ceropegia* taxa were collected and studied namely: *Ceropegia anjanerica* Malpure et al., *C. anantii* S. R. Yadav et al., *C. attenuata* Hook., *C. bulbosa* Roxb. var. *bulbosa*, *C. bulbosa* var. *lushii* (J. Graham) Hook. *f*., *C. evansii* McCann, *C. fantastica* Sedgwick, *C. hirsuta* Wight & Arn., *C. huberii* M. Y. Ansari, *C. jainii* M. Y. Ansari & B. G. Kulk., *C. juncea* Roxb., *C. karulensis* Punekar et al., *C. maccannii* M. Y. Ansari, *C. mahabalaei* Hemadri & M. Y. Ansari, *C. maharashtrensis* Punekar et al., *C. media* (Huber) M. Y. Ansari, *C. mohanramii* S. R. Yadav et al., *C. noorjahanae* M. Y. Ansari, *C. oculata* Hook. var. *oculata*, *C. oculata* Hook. var. *satpudensis* Punekar et al., *C. odorata* Nimmo ex Hook. *f*., *C. panchganiensis* Blatt. & McCann, *C. rollae* Hemadri, *C. sahyadrica* M. Y. Ansari & B. G. Kulk., *C. santapaui* Wadhwa & M. Y. Ansari, *C. spiralis* Wight and *C. vincaefolia* Hook. These have been screened for their molecular and morphological systematics.



<u>Project 9:</u> Afforestation: Eco-restoration and forest regeneration studies of degraded hill slopes of Palashi and Mirje villages located at the fringes of the Western Ghats.

Project Duration: 7 years (2011-2018)

Project Summary: Conservation of our natural resources is one of the basic needs for further survival of life on earth. However, overexploitation of these resources is one of the hurdles doubted our self-destroyer. Qualitative sustainable development can be a good contribution for clean and better survival. While considering the present need, creating resources without causing harm to local biodiversity could be effective management and serve as good sustainable practice. Therefore, afforestation programme has been taken up, and the uniqueness of this programme is instead of planting invasive or foreign plant species, we prefer local, endemic species. Objective was to regenerate the green cover of degraded hill slopes with plants indigenous to the region and to develop biodiversity hub for the socio-economic benefit of the local inhabitants and other organism. Proper care and maintenance of afforested land leads to creation of a healthy and rich bio-diversity hub at Mirje and Palashi villages and this provided the food and shelter for insects, reptile and other dependent organisms. Afforestation helped to improve social economic aspects while harvesting the forest resources.

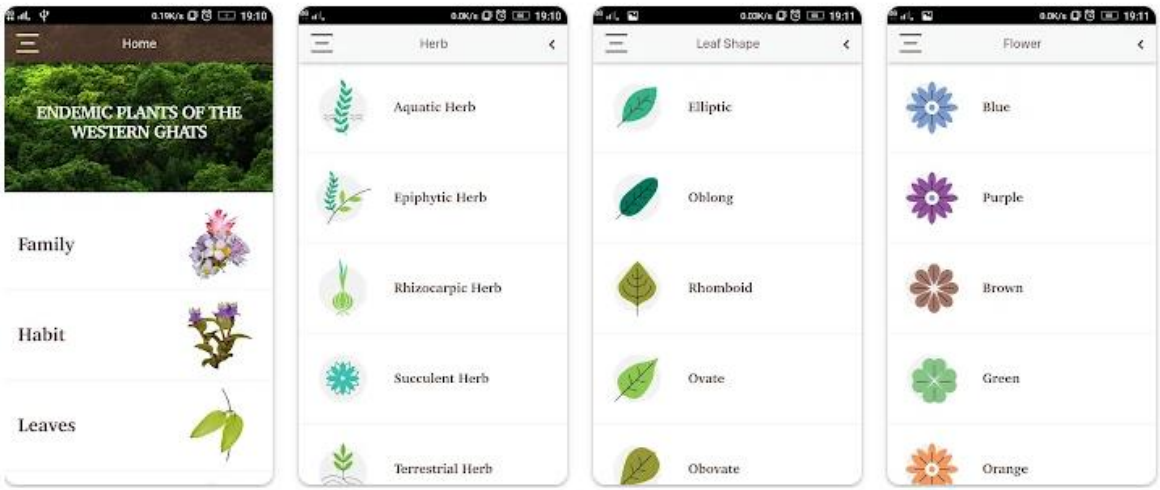
Mirje and Palashi site before the 2015 Plantation in year 2011

After the Plantation at Palashi site in

Project 10: Reviewing our current knowledge of the taxonomy of endemic plants in northern Western Ghats, India.

Project duration: July 2019– March 2022

Project Summary: To photo-document endemic plants from the northern Western Ghats for mobile application. To assess IUCN threat to some neo-endemic plant species and submission to the IUCN. More than 150 endemic plants have been documented and 100 are available through the Google play store - (https://play.google.com/store/apps/details?id=com.godrej.ngcpr.endemicplants&hl=en_IN). The identification guide has been prepared with multiple characters like leaves, flower colour, and family. Informative photographs, descriptions, distribution, and common names have provided for ease of identification. Data based on chromosome count, IUCN status, and biological or potential values for these 150 plants is submitted and updated to GITL.



Project 11 Conserving endangered botanical collection of M. R. Almeida (1939–2017) from India: incorporation and digitization.

Project duration: April 2021-2022. Sanctioned in April 2021 under Small Grant Collection support by **International Association for Plant Taxonomy (IAPT) SLOVAKIA**

Project Summary: M.R. Almeida (1939–2017) was a prominent plant taxonomist from India; whose major contribution to the floristic studies in the Western Ghats is noteworthy. This

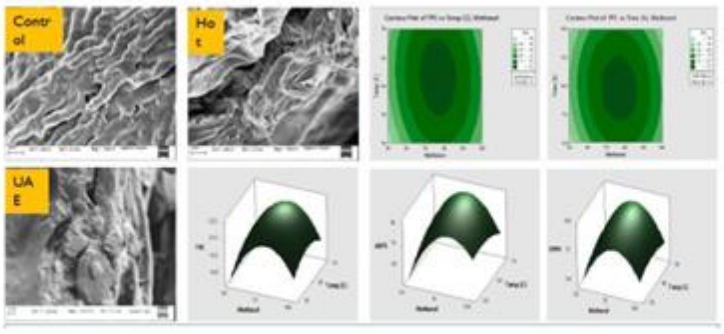
collection was made by him with other co-workers between 1960 to 1998, mainly from Western India and most are referred to in the treatment of 'Flora of Maharashtra (Vol.1 to 6)'. Due to poor maintenance, many specimens are deteriorating and need immediate conservation attention. This proposal is an endeavour to transfer this collection to the NGCPR herbarium, its restoration, curation, and dissemination via digitization. Transfer of Dr. Almeida's plant collection from Sawantwadi to NGCPR. Shorting and cleaning of the collection has been done. Sorting, labeling, data entry, and imaging of the specimens completed. The specimens were digitized and uploaded to NGCPR's website.

Figure: Identifying and sorting the herbarium collection at Dr. Almeida's ancestral house Sawantwadi.

<u>Project 12:</u> Phytochemical analysis (secondary metabolites) and study of antioxidant and anticancer potential of *Lobelia nicotianifolia*

Project duration: 2017 to 2020

Project summary: *Lobelia nicotianifolia* is commonly known as wild tobacco, which is endemic to the Western Ghats. Like other species in this group, this species has rich source of *Lobeline* alkaloid. In this project the effect of altitudinal variations in phenolics, flavonoids, and lobeline content in 10 populations of *L. nicotianifolia* from northern Western Ghats region has been documented. This study has revealed a significant effect of altitude on the production of pharmaceutically important bioactive principles which correlate with their antioxidant potential. These analyses were validated using Multivariate Analysis and Hierarchical Clustering Analysis which distributed the populations in different clusters based on their altitudinal changes, bioactive principles, and antioxidant potential. This approach will help conserve wild populations of *L. nicotianifolia*, which can further be mass multiplied to meet the demand of pharmaceutical industries. The work has been carried out by establishing an efficient protocol for secondary metabolites extraction using the hot/ cold extraction method; through the qualitative and quantitative analysis of phytochemicals present in different plant parts (leaves, stem, and roots) by TLC and HPTLC methods; establishing GC-MS and LC-MS protocol to identify phytochemicals present in organic extract; and the species also studied for their antioxidant and anticancer potential.



Extraction of polyphenols in *Lobelia*: Extract SEM

<u>Project 13:</u> Taxonomic studies on the species described N.A. Dalzell

Project Duration: 2018– 2021

Project Summary: Nicol Alexander Dalzell, a Scottish Botanist and Conservator of Forests (Bombay Presidency) who described more than 18 genera and 300 species from Western India between 1840 to 1867. His collections are placed at Kew, Kolkata, and Dehradun Herbaria. Many of the species described by him are endemic. Some of his species have been transferred to different genera while a few are synonymized. In the present day very, scattered information is available about these species, and therefore, comprehensive taxonomic revision is proposed.

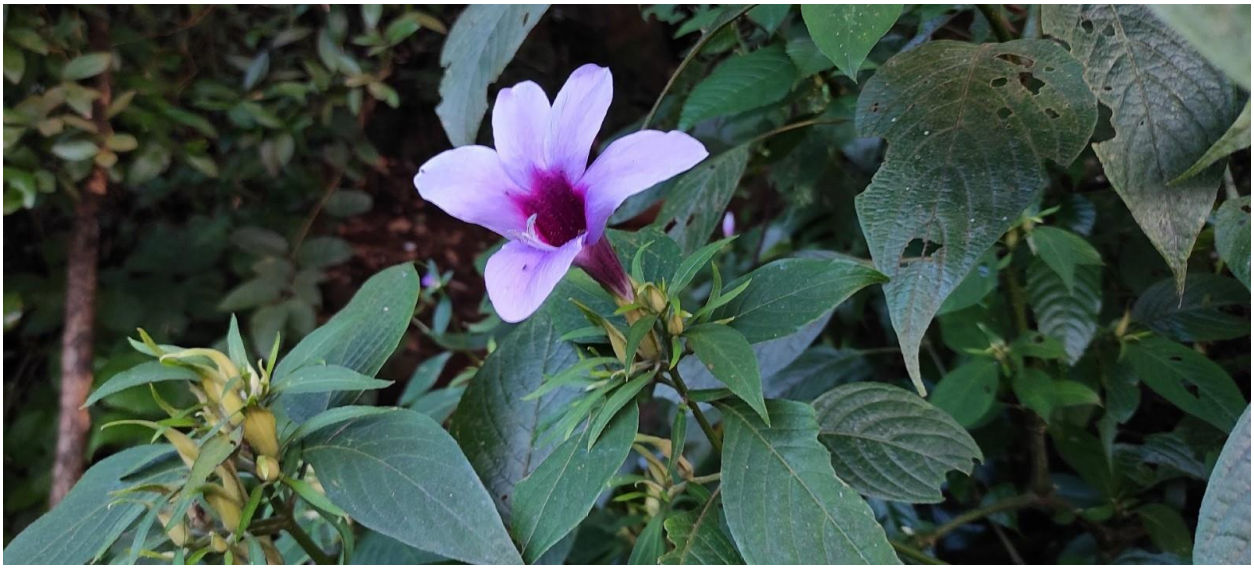


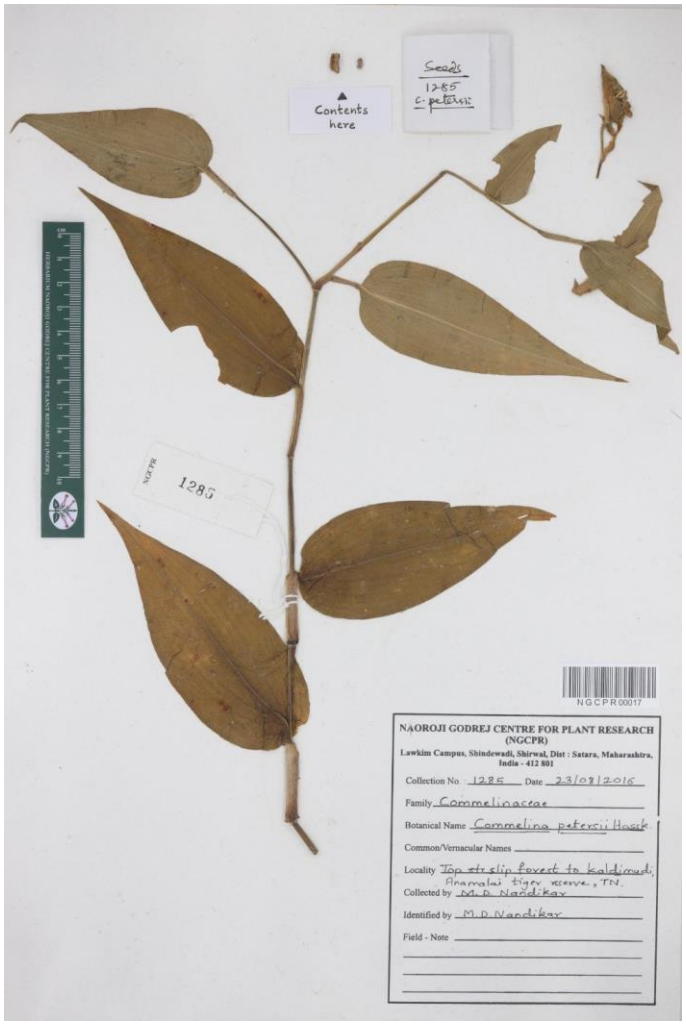
Figure: *Barleria elata* Dalzell, one of the elegant Barleria endemic to the Western Ghats described by NA Dalzell and has ornamental potentials.

<u>Project 14:</u> Digitization of NGCPR Herbarium

Project Duration: 2020–2022 in collaboration with **Godrej Infotech Limited**

Project Summary: Publication and citations; remote study (eLoans); reduce the physical handling, and potential damage of the specimens; species identification, and confirmation; facilitate specimen label data; public outreach, to promote the collection at the Institution. The

objective was to capture the highest quality digital image of a specimen to make a digital copy of the physical specimen and upload it online with barcode details. NGCPR has 3800 specimens available through [http://ngcpr.org/herbariumCatalogue.aspx.](http://ngcpr.org/herbariumCatalogue.aspx)



<u>Project 15:</u> Taxonomic studies on the species described N.A. Dalzell

Project Duration: 2018 - 2021

Project Summary: N.A. Dalzell's *Bombay Flora* is the first comprehensive floristic account for the Bombay Presidency which was published in 1861. Dalzell was a keen economic botanist, forest conservator and trained taxonomist, who had contributed more than 250 new species from the northern Western Ghats. The number estimates second highest after Robert Wight, who contributed 1267 for flora of India. The taxonomic status of the species described by Wight is clearer as his work was revised by Noltie (2005). However, no comprehensive work has been done to recognize the distinct status of the species described by Dalzell. Dalzell is known to have sent to Sir J.D. Hooker many dried plant specimens described and illustrated by him in Hooker's Journal of Botany. Similarly, he used to maintain his personal herbarium, which is gifted to Kew by Mrs. Dalzell after Dalzell's death. Due to the multiple specimens, there is uncertainty to consider the holotype. Moreover, localities mentioned by the Dalzell in the protologue are often vague and have been missed out in many specimens. At some instances multiple collectors and different labels have been found to be associated with Dalzell's specimens. Thus, the trail of Dalzell's specimens sadly left a nomenclature ambiguity for many of the species described by Dalzell. Faced with a deluge of lectotypification articles on Dalzell's names, rediscovery, resurrection, relegation of Dalzell's species in recent decades, we felt the urgent need for a comprehensive account of all Dalzell's binomials. Thus, this project has been undertaken. It involves physical consultation of Dalzell's specimens, protologues collection of live specimens and understanding their taxonomic position. The objective was to enumerate the species described by NA Dalzell, procurement of protologues and types, herbarium consultation of national and international herbaria, field visits, collection of the species, herbarium preparation, description, illustration, photography, compilation and preparation of database and publication. Nicol Alexander Dalzell, a Scottish Botanist and Conservator of Forests (Bombay Presidency) who described more than 18 genera and 300 species from Western India between 1840 to 1867. His collections are placed at

Kew, Kolkata, and Dehradun Herbaria. Many of the species described by him are endemic. Some of his species have been transferred to different genera while a few are synonymized. Presently very scattered information is available about these species, and therefore, a comprehensive taxonomic revision is proposed. Procurement of protologue, and types from K, CAL and DD herbaria. Kew has a total of 548 specimens, CAL has nearly 140 specimens and DD has 60 specimens belonging to 186 genera and 306 species. Arrangement of the types and typification data for all the 60 families wherein species have been described Dalzell is completed. Field visits during the project tenure at different localities in Karnataka and Maharashtra resulted in the collection and photography of 58 Dalzell's species.

Figure: An endemic tree species described by NA Dalzell

<u>Project 16:</u> A synopsis of Nimmo's Croton (Euphorbiaceae: Crotoneae) including an overlooked new species from India

Project Summary:

Graham's posthumous publication (Cat. Pl. Bombay, 1839) was completed by Joseph Nimmo, in addition to contributing several new species to it. *Croton gibsonianus* Nimmo and *C. lawianus* Nimmo (Euphorbiaceae) were part of this addition, and both were described based on Gibson's collection from adjoining localities in Western India. As the diagnosis of the latter species was scant, it was subsequently interpreted in different genera viz. *Dimorphocalyx, Trigonostemon* and

Tritaxis. Due to misinterpretation of the protologue and Gibson's Croton collection housed at K, the name *C. lawianus* was wrongly applied to *C. gibsonianus* by subsequent authors. This inadvertent application of name is corrected here and refers to the hitherto undescribed new species *C. chakrabartyi*. Our recent collection of *C. gibsonianus* has turned out to be a rediscovery after 170 years. The nomenclature, description, photographs, and distribution of *C. gibsonianus* are provided to avoid further taxonomic ambiguity.

TABLE 1 Comparative morphology of *C. gibsonianus* Nimmo and *C. chakrabartyi* Dhabak & Nandikar

Characters	*C. gibsonianus*	*C. chakrabartyi*
Habit	a tree, up to 6 m high	a shrub, up to 2 m high
Leaf		
phyllotaxy	alternate, bifarious	alternate-spiral to subopposite
shape	ovate	elliptic-oblong
margin	entire, ciliate	serrate, glandular at tip
venation	actinodromous	penninerved
Inflorescence	ca. 5 cm in length	10–30 cm in length
Stamens	15–21	9–12
Male flower Nectaries	cordate	oblate
Sepal in female flowers	ovate-elliptic, 4 – 10 × 3 – 5 mm, accrescent in capsule	ovate, ca. 2.5 × 1 mm, not accrescent in capsule
Ovary	ovoid, ca. 3 × 3 mm, sparsely stellate hairy	globose, ca. 2 mm in diameter, densely stellate hairy
Capsule	green-yellow, ovoid to sub globose, 14 – 18 × 15 – 17 mm, glabrous to sparsely stellate hairy	greyish brown, globose, 9 – 14 mm in diameter, densely stellate hairy

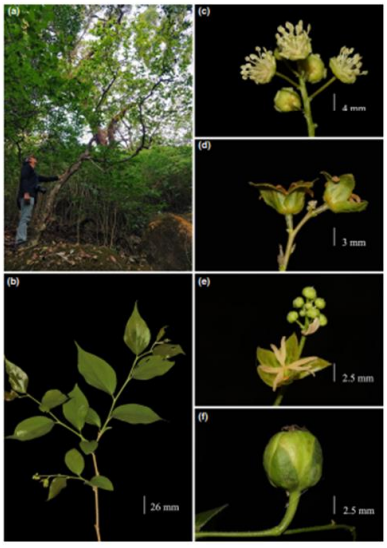


FIGURE 2 *Croton gibsonianus* - (a) Habit, (b) Flowering twig, (c) Male flowers, (d) Female flowers (lateral view), (e) Female flower (top view), (f) Capsule. Photographs: Maniruddin Dhabak

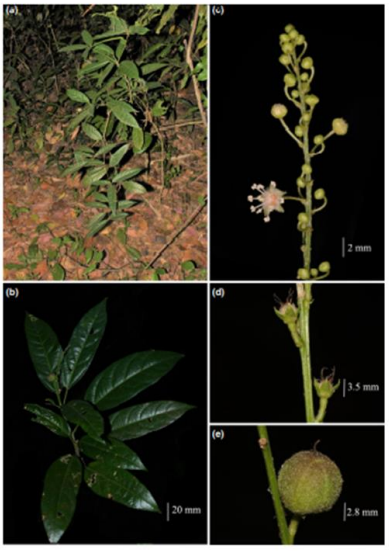


FIGURE 3 *Croton chakrabartyi* - (a) Habit, (b) Branch, (c) Male flowers, (d) Female flowers, (e) Capsule. Photographs: Mayur Nandikar & Navendu Page (C)

<u>Project 17:</u> Nutritional value assessment of *Cissus woodrowii* (Stapf ex Cooke) Santapau plant parts: An underutilized endemic plant of the Western Ghats of India

Project summary:

Malnutrition in developing countries can be reduced to a certain extent by using various underutilized wild plants in the diet. *Cissus woodrowii* (Stapf ex Cooke) Santapau is an underutilized plant species of the Vitaceae family that is endemic to Maharashtra and Karnataka state of India. In this study, the nutritional value of *C. woodrowii* leaf, stem, and root is reported. The leaves have higher proximate value, energy, minerals, and vitamins than those of the stem and roots of *C. woodrowii*. In addition, two antinutritional factors (oxalate and phytate) were also recorded from plant parts of *C. woodrowii*. This study revealed that the leaves of *C. woodrowii* are rich in nutrients and energy and can be utilized to overcome malnutrition. *C. woodrowii* is an underutilized shrub species of the Vitaceae family. The plant parts of *C. woodrowii* are a good source of different nutrients and minerals which can suffice the nutritional demand of the local population. Considering its availability in Indian states like Maharashtra and Karnataka and its shrub-like habit it is recommended for the commercial exploitation of *C. woodrowii*.

<u>Project 18:</u> Assessment of radical scavenging activity and estimation of EC50 values of various extracts of leaves and roots from *Lobelia nicotianifolia* Roth. (Wild Tobacco)

Project Summary: The antioxidant potential (% RSA and EC50) of solvent extracts of leaves and roots of *Lobelia nicotianifolia* Roth. was assessed using five in vitro assays. The EC50 values of methanolic extract were comparable to that of ascorbic acid for nitric oxide (30.67 µg mL−1) and hydrogen peroxide (81.01 µg mL−1) radical assays. The % RSA and EC50 correlated with the total phenolic content and total flavonoid content. The characterization by liquid chromatography-high-resolution mass spectrometry showed the presence of five flavonoids, six phenolics, three carotenoids, one anthraquinone, coumarin, hydroxyquinone, and isoflavonoid. Embelin, gallic acid, and quercetin were quantified by high-performance liquid chromatography.

Project 19: Altitudinal gradients influence the accumulation of pharmaceutically important phenolic compounds in the leaves of *Lobelia nicotianifolia* Roth. and regulates its antioxidant and anticancer properties.

Project Summary: This study was intended to investigate the effects of altitudinal gradients on the accumulation of phenolic compounds and bioactivity among different populations of *Lobelia nicotianifolia* Roth. from the Northern Western Ghats of India. High-performance liquid chromatography (HPLC) revealed a maximum content of embelin (16.36 µg/g DW), gallic acid (53.47 µg/g DW), and quercetin (18.93 µg/g DW) in Kas population (1148 m m.s.l.). *L. nicotianifolia* from Kas region has higher radical scavenging activity in 2,2-Diphenyl-1-picrylhydrazyl (DPPH) and 2,2 -azino-bis(3-ethylbenzothiazoline 6-sulfonic acid) (ABTS) assays and exhibited higher cytotoxicity against two breast cancer cell lines (MCF-7 and MDA-MB231). Correlation analysis indicates a significant relationship between altitudinal gradients of *L. nicotianifolia* population and accumulation of phenolic compounds and bioactivity. Principle component analysis (PCA) and hierarchical cluster analysis (HCA) grouped *L. nicotianifolia* populations into different clusters based on their altitudes. *L. nicotianifolia* from Kas region (1148 m) is selected as an elite population because of its potential to accumulate higher phenolic compounds and subsequent bioactivity. In conclusion, the present work is the first study performed on the influence of the altitudinal gradients on the accumulation of phenolic compounds and bioactivity in the leaves of *Lobelia nicotianifolia*. The higher accumulation of embelin, gallic acid, and quercetin and bioactivity were seen for Kas population among all studied populations from northern Western Ghats of India. Further, the Pearson correlation analysis supports our observations that altitudinal gradients are an important parameter to perceive significant results in *L. nicotianifolia*. The statistical tools like PCA and HCA categorize the studied populations in different clusters based on their altitude and their response to an accumulation of phenolic compounds and bioactivity. The results conclude that the different plant populations need to be screened to score the influence of different environmental factors instead of haphazard collection for the pharmaceutical

industries.

Project 20: *Commelina erecta* (Commelinaceae), new distributional record for Indian subcontinent

Project Summary: The Linnaean *Commelina erecta* (Commelinaceae) is recorded for the first time from Indian subcontinent. A comparative account of congeneric taxa is provided here in addition to the detailed morphological description and photographs for ease in identification. Although tropical African plants of *Commelina erecta* are said to have usually clustered spathes, which is not observed in Indian specimens, spathes are rarely 2-3 but usually solitary. Similarly, African plants shows light to deep blue flowers, but in our collection, it varies from pale to deep blue to mauve to lilac, or mixed shades of blue and lilac, but lateral stamen filaments are consistently blue, even in lilac or mauve flowers. Capsules also vary from 1 to 3 locules, often the dorsal locule is found to be indehiscent or absent. Nevertheless, these characters are inconsistent and vary within the population and hence insignificant to determine any infraspecific rank. The deposition of soft white or brown material on the periphery of the seeds is common in *C. ensifolia, C. kurzii, C. paludosa*, however, it is comparatively predominant in the seeds of *C. erecta*.

Project 21: Development of an arboretum at Ajnuj Conservatory Centre

Project duration: April 2023- March 2024

Project Summary: To develop an arboretum based on native plant species for education awareness purposes. Over 400 plants of 100 native species have been planted at Ajnuj Conservatory. The area was fenced, and watering was provided by using a drip irrigation system. It contains a variety of plant species that include economically important, and medicinally important tree species as well as herbs, shrubs, and climbers. Table 1 contains information on plant species.

Table: 1. List of the Plant species Planted at Ajnuj Conservatory

S No	Scientific Name	Marathi Name	Type
1	*Mangifera indica*	Amba	Tree
2	*Butea monosperma*	Palas	Tree
3	*Bauhinia purpurea*	Kanchan	Tree
4	*Saraca indica*	Sita Ashok	Tree
5	*Cassia fistula*	Bahava	Tree
6	*Michelia champaca*	Sonchafa	Tree
7	*Gmelia arborea*	Shivan	Tree
8	*Lagerstroemia speciosa*	Tamhan	Tree
9	*Terminalia bellerica*	Beheda	Tree
10	*Jasminum malabaricum*	Kusar	Creeper
11	*Phyllanthus reticulatus*	Madhavilata	Creeper
12	*Terminalia arjuna*	Arjun	Tree
13	*Terminalia elliptica*	Ain	Tree
14	*Terminalia paniculata*	Kinjal	Tree
15	*Bauhinia tomentosa*	Piwla Kanchan	Tree
16	*Lagerstroemia indica*	Gulmendi	Tree
17	*Clematis heynei*	Ranjai	Creeper
18	*Magnolia grandiflora*	Kavathi Chafa	Tree
19	*Garcinia indica*	Kokam	Tree
20	*Anogeissus latifolia*	Dhawda	Tree
21	*Syzygium jambos*	Jambhul	Tree
22	*Jasminum auriculatum*	Jui	Creeper
23	*Jasminum multiflorum*	Sayali	Creeper

24	*Hardwickia binata*	Anjan	Tree
25	*Albizia procera*	Kinnai	Tree
26	*Bridelia retusa*	Asana	Tree
27	*Anacardium occidentale*	Kaju	Tree
28	*Mesua ferrea*	Naagchafa	Tree
29	*Tinospora cordifolia*	Gulvel	Creeper
30	*Calophyllum inophyllum*	Undi	Tree
31	*Pongamia pinnata*	Karanj	Tree
32	*Mimusop elengi*	Bakul	Tree
33	*Amoora rohituka*	Rohitak	Tree
34	*Pterospermum xylocarpum*	Muchkunda	Tree
35	*Basella alba*	Mayalu	Creeper
36	*Rosa clomacena*	Veligulab	Creeper
37	*Lagerstroemia microcarpa*	Nana	Tree
38	*Trema orientalis*	Ghol	Tree
39	*Artocarpus heterophyllus*	Phanas	Tree
40	*Boswellia serrata*	Salai	Tree
41	*Annona reticulata*	Ramphal	Tree
42	*Clitoria ternatea*	Gokarna	Creeper
43	*Diospyros paniculata*	Tembhurni	Tree
44	*Drypetes roxburghii*	Putranjiva	Tree
45	*Madhuca latifolia*	Dakshin Moha	Tree
46	*Alstonia scholaris*	Saptaparni	Tree
47	*Abrus precatorius*	Gunj	Creeper
48	*Limonia acidissima*	Kawath	Tree
49	*Catunaregam spinosa*	Gela	Tree
50	*Dendrocalamus strictus*	Bamboo-Mesh	Tree
51	*Nyctanthes arbor-tristis*	Parijat	Tree

52	*Areca catechu*	Supari	Tree
53	*Elaeagnus conferta*	Ambulki	Creeper
54	*Protasparagus racemosus*	Shatavari	Creeper
55	*Aegle marmelos*	Bel	Tree
56	*Oroxylum indicum*	Tetu	Tree
57	*Azardirachta indica*	Kadulimb	Tree
58	*Thespesia populnea*	Bhendi	Tree
59	*Cymbopogon citratus*	Lemon Grass	Grass
60	*Stereospermum chelonoides*	Kalagori, kalgari, paadal	Tree
61	*Careya congerta*	Karwand	Tree
62	*Crossandra infundibuliformis*	Aboli	Shrub
63	*Murraya exotica*	Kamini	Tree
64	*Plumbago zeylanica*	Chitrak	Shrub
65	*Hibiscus rosa-sinensis*	Jaswand	Shrub
66	*Vitex negundo*	Nirgudi	Tree
67	*Jasminum sambac*	Mogra	Shrub
68	*Nerium oleander*	Kaner	Shrub
69	*Pterocarpus marsupium*	Bija	Tree
70	*Heterophragma quadriloculare*	Waras	Tree
71	*Albizia lebbeck*	Shirish	Tree
72	*Acacia leucophloea*	Hiwar	Tree
73	*Firmiana Colorata*	Kaushi	Tree
74	*Stereospermum suaveolens*	Paadal	Tree
75	*Prosopis cineraria*	Shami	Tree
76	*Jasminum polyanthum*	Kunda	Shrub
77	*Gardenia*	Anant	Shrub
78	*Madhuca longifolia*	Moha	Tree
79	*Dolichandrone falcata*	Medhshingi	Tree

80	*Schleichera oleosa*	Kusumb	Tree
81	*Careya arborea*	Kumbh	Tree
82	*Tabernaemontana divaricata*	Tagar	Shrub
83	*Vetiveria zizanioides*	Vaala	Shrub
84	*Sapindus laurifolius*	Reetha	Tree
85	*Radermachera xylocarpa*	Khadshingi	Tree
86	*Mitragyna parvifolia*	Kalam	Tree
87	*Adenanthera pavonina*	Ratangunj	Tree
88	*Sesbania grandiflora*	Hadga	Tree
89	*Ficus hispida*	Dhedumbar	Tree
90	*Grewia asiatica*	Phalsa	Tree
91	*Terminalia chebula*	Hirda	Tree
92	*Semecarpus anacardium*	Bibba	Tree
93	*Dillenia indica*	Karmal	Tree
94	*Canna indica + Cyperus alternifolius*	Canna + Umbrella Palm	Shrub
95	*Cocos nucifera*	Naral	Tree
96	*Ziziphus mauritiana*	Ghatbor	Tree
97	*Emblica officinalis*	Awla	Tree
98	*Cordia wallichii*	Burgund	Tree
99	*Barringtonia acutangula*	Newar	Tree
100	*Artocarpus lacucha*	Buddha Naral	Tree
101	*Trichilia connaroides*	Limbhara	Tree
102	*Ailanthus excelsa*	Maharukh	Tree
103	*Ficus arnottiana*	Payar	Tree
104	*Erythrina indica*	Pangara	Tree
105	*Bombax ceiba*	Katesawar	Tree
106	*Erythrina stricta*	Buchpangara	Tree
107	*Erythrina suberosa*	Raatpangara	Tree

108	*Phoenix sylvestris*	Shindi	Tree
109	*Bombax pentandra*	Pandhari Sawar	Tree
110	*Morinda pubescens*	Bartondi	Tree
111	*Sterculia urens*	Pandhruk	Tree
112	*Ficus microcarpa*	Nandruk	Tree
113	*Ficus religiosa*	Pimpal	Tree
114	*Ficus glomerata*	Umber	Tree
115	*Caroyeta urens*	Ardhsupari Palm	Tree