

75 Unique Plant Germplasm Collections by the ICAR-NBPGR





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(First column left to right) *Sauropus androgynus*, *Tubocapsicum anomalum*; (second column) *Zea mays* (popcorn), *Herpetospemum operculatum*, *Allium przewalskianum* (inflorescence); (third column) *Momordica cochinchinensis* var. *andamanica* (fruit, flower)

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This publication contains information on germplasm collected during exploration missions conducted by the Indian Council of Agricultural Research-National Bureau of Plant Genetic Resources, New Delhi. The information is compiled using raw data collected during explorations and from pre-published records by the scientists of ICAR-NBPGR. Hence no part of this document should be reproduced or published without the prior approval of the Director, ICAR-NBPGR, New Delhi 110012, India.

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त्रिलोचन महापात्र, पीएच.डी.

सचिव, एवं महानिदेशक

TRILOCHAN MOHAPATRA, Ph.D.
SECRETARY & DIRECTOR GENERAL

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MESSAGE

ICAR- National Bureau of Plant Genetic Resources (NBPGR) is the nodal organization in India for all activities concerning exploration, acquisition, evaluation, conservation and documentation of plant genetic resources. The 75th Year of Nation's Independence is being celebrated as **Azadi Ka Amrut Mahotsav** among constituent organizations of the Indian Council of Agricultural Research. I am happy to know that the NBPGR is bringing out a series of publications as part of **Azadi Ka Amrut Mahotsav**. These include "75 Unique Introductions in Plant Genetic Resources", "75 Quarantine Pests Intercepted by ICAR-NBPGR", "75 Trait Specific Germplasm Identified by ICAR-NBPGR", "75 Unique Germplasm Collected by ICAR-NBPGR" and "75 Accessions Utilized in Varietal Development".

These publications will be released on the occasion of NBPGR's 46th Foundation Day. I do hope that these publications will create awareness about the value of the germplasm and enhance their utilization.

I congratulate NBPGR on the occasion of 46th Foundation Day and convey my best wishes to the staff of NBPGR in their sustained endeavour.

(T. MOHAPATRA)

Dated the 29th July, 2022
New Delhi

SUMMARY

The present compilation entitled **‘75 Unique Plant Germplasm Collections by the ICAR-NBPGR’** consists information on germplasm assembled through vigorous efforts by the explorers of Division of Plant Exploration and Germplasm Collection, ICAR-NBPGR, New Delhi. The information is grouped under four categories: (1) trait-specific germplasm collections validated through field and laboratory experiments; (2) new species of agricultural importance (majority of them classified under vegetables and spices groups) collected, described and reported; (3) species occurring in new areas i.e. ‘extended distribution records of taxa’; and (4) potential crops/species being consumed/grown by the local inhabitants that are considered nutritionally rich and locally adapted crops of future including crop wild relatives. Within a period of four-five decades, a lot of notable/trait-specific/unique rare, endangered and threatened species of PGR value have been collected, conserved and used in National Agricultural Research System (NARS) in the country. This compilation is an attempt to document selected 75 unique plant germplasm collections out of 50 thousand valuable higher plants from the Indian gene centre. In this auspicious year of 75 years of independence, the book is dedicated to the nation.

ABOUT THE BOOK

Indian subcontinent is one of the primary or secondary centres of agri-biodiversity and listed among the major phyto-geographical regions of diversity, concentrated mainly in the north-eastern Himalaya, north-western Himalaya, Western Ghats and Andaman & Nicobar Islands (Vavilov, 1926; Arora, 1988). Collection and identification of important primary, secondary and tertiary gene pools of crop taxa form an integral part of plant genetic resources (PGRs) management programme (Singh and Srivastava, 2004; Mandal, 2022). Nearly 861 wild relatives of crop species (769 species) belonging to 171 crops found in India are distributed in different parts of the country (Pradheep *et al.*, 2014).

The publication on “**75 Unique Plant Germplasm Collections by the ICAR-NBPGR**” is an effort to document these resources from the Indian region. The book is a long-awaited document from the Division of Plant Exploration and Germplasm Collection, ICAR-NBPGR, that deals with the notable germplasm identified and collected during exploration. The contents of the document include 7 chapters. Chapter 1 provides an introduction to the total exploration background with process of collecting in brief and the status of diversity; chapters 2, 3, 4 and 5 detail out the trait-specific germplasm, new records and new species identified, extended distribution of taxa and potential species respectively along with photographs and illustrations provided for the interest of users. Each of the 2-5 chapters covers the taxa as description sheets with important images. In all, the book includes 75 unique/significant collections (12 trait-specific germplasm, 19 new species described, 24 new/extended distribution records of taxa and 20 potential species) belong to 27 families, 42 genus and 75 species. The family-wise breakup is given in Table 1. In the end, chapter 6 is an ‘overview’ to sum-up the contents with future areas of concern and references quoted in the text are given as chapter 7. Additionally, taxa dealt in the document with family are listed in Annexure-1 to provide a quick access.

Table 1: Family-wise breakup of taxa

S. No.	Family	No of Species
1	Cucurbitaceae	14
2	Zingiberaceae	8
3	Amaryllidaceae	7
4	Malvaceae	6
5	Fabaceae	6
6	Poaceae	6
7	Solanaceae	3
8	Euphorbiaceae	3
9	Asteraceae	2

S. No.	Family	No of Species
10	Dioscoreaceae	2
11	Tiliaceae	2
12	Lamiaceae	1
13	Amaranthaceae	1
14	Anacardiaceae	1
15	Apiaceae	1
16	Apocynaceae	1
17	Arecaceae	1
18	Asparagaceae	1
19	Brassicaceae	1
20	Cleomaceae	1
21	Juglandaceae	1
22	Piperaceae	1
23	Polygonaceae	1
24	Rhamnaceae	1
25	Rutaceae	1
26	Saururaceae	1
27	Scrophulariaceae	1
	Total	75

The document on “75 Unique Plant Germplasm Collections by the ICAR-NBPGR” is mainly an outcome of previous exploration missions executed under various programmes involving partners from ICAR institutes, State Agricultural Universities (SAUs) and other Government organizations. The data have been abstracted from previously conducted explorations and from the pre-published documents by ICAR-NBPGR. The main purpose of this compilation is to prioritize and make available at a glance the significant diversity collected from various parts of India. The authors hope that the information will serve as ready-reckoner for the users while planning newer missions.

Firstly, we express our gratitude and extend our sincere thanks to Dr. Trilochan Mohapatra, Secretary, DARE and Director General, ICAR and Dr. Ashok Kumar, Director (Acting), ICAR-NBPGR, New Delhi for their visionary approach in emphasizing on the valuable germplasm collections that were envisioned for the genesis of present document. We appreciate the efforts of our colleagues especially Drs. Puran Chandra, RK Pamarthi, PK Malav, Soyimchiten and PK Kannaujia who were directly or indirectly involved in the compilation of this publication.

New Delhi

Authors

INTRODUCTION

The increasingly changing world environment has posed serious threats leading to genetic erosion and extinction of crop landraces and disappearance of traditional methods and plant genetic resources. To counteract the imminent threat of genetic erosion and consequences on population, there is urgency for germplasm collecting (Arora, 1988; Paroda *et al.*, 1999)

Before proceeding for an exploration for highly diverse genepool of a species, plant genetic resources (PGR), propagation mechanism and mode of conservation (seed, bulb and rhizomes) needs to be well understood (Zeven & Zhukovsky, 1975). Collecting of PGR include various activities, such as survey, conducting explorations including rescue missions, bio-prospecting, networking etc. for conservation. While the general principles of collecting plant genetic resources are established and widely followed by the explorers, to identify the scattered output as significant types in need is a tiresome effort (Arora, 1988; Mandal, 2022). Despite largest germplasm collections maintained in national holdings, identity issues to tag the value of germplasm 'notable for users' is an utmost effort and thus the information casted in this form becomes extremely valuable and useful.

Indian gene centre has a wide variation in the topography from snow laden mountains and cold deserts of the Himalaya; Gangetic plains; Deccan plateau; hot and arid region of the Thar Desert; the Peninsula; guarding coastal lines with mangroves and Islands grouped amidst the ocean. Four of the global biodiversity hot-spots: The Western Ghats; The Himalayas; Indo-Burma; and the Sundaland are located here (Arora, 1988; Pradheep *et al.*, 2014; Mandal, 2022). It possesses an estimated plant diversity of 54,733 taxa (angiosperms, gymnosperms, pteridophytes, bryophytes, lichens, fungi and algae). Estimated data of angiosperms (21,849 species) constitute nearly 40 per cent of the total taxa in India (BSI, 2020).

The scope of searching for valuable germplasm/species of PGR relevance has remained under the umbrella of agri-biodiversity wherein higher plants (nearly 500 species of cultivated plants) play a vital role towards providing food, fodder, fibre, medicine, aesthetic, commerce and industrial support. Besides, wild plant genetic diversity is an essential resource for the success of crop improvement programme. With ICAR-NBPGR mandated crops, collection of angiosperms constitutes many such notable germplasm of current and future use; hence are on the pipeline of collection, validation study, simultaneously through evaluation to enhance the scope for utilization.

Indian Council of Agriculture Research-National Bureau of Plant Genetic Resources (ICAR-NBPGR), established in 1976, serves the nation by providing valuable plant genetic resources of species of agricultural value, wild relatives worth conservation and sustainable utilization through survey, inventory, documentation, taxonomic research and creating awareness on its use. Since reorganization of ICAR-NBPGR in 1976, the scientists have collected and assembled germplasm of over 2,200 taxa including over 10 percent notable collections in the form of new species, distinct germplasm, new reports on cultivation/uses of plants, besides associated indigenous traditional

knowledge (ITK). Since the material recorded during the time of collection is difficult to confirm for its traits of uniqueness, the accessions/germplasm deserves validation to establish its notable trait. The activity of validation is done by grow out experiments through morphological and anatomical studies, but many times using biochemical or molecular tools also.

Till 2022, the plant explorers from the Division of Plant Exploration and Germplasm Collection solely or in collaboration with other organizations have recorded interesting germplasm; include wild relatives of many potential, agriculture, horticulture, medicinal and ornamental plants, which are the under category of Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern and Data Deficient, following the International Union for Conservation of Nature (IUCN) category and criteria. A total of eight phytogeographical regions (Fig. 1) have been explored and 2,81,759 accessions (incl. germplasm collected under National Agricultural Technology Project on Sustainable Management of Plant Biodiversity) comprising of cultivated (2,11,574) and wild species (38,950) in different crop-groups have been assembled through 2,838 explorations conducted by ICAR-NBPGR headquarter and its Regional Stations/Base centres in collaboration with ICAR crop-based institutes, State Agricultural Universities (SAUs), Krishi-Vigyan Kendras (KVKs) and other stakeholders.

The plant taxonomy with integration of modern tools and techniques; biosystematics and phylogenetic study has played a prominent role by claiming evidence for solving the species complex to establish the evolutionary relationships in plant species across the globe. With the help of these tools, 48 new taxa mainly encountered during visits to areas of expedition have been identified and described by the ICAR-NBPGR and have given the visibility of plant exploration at the global scale.

Methodology for collecting specific material

Follow-up of technical and logistical planning are important in any of the collecting programmes, which have been discussed at length by various researchers/scientists/workers (Arora, 1988; Guarino *et al.*, 1995).

Setting clear objectives of collection mission mainly define a strategy (or strategies) for collecting (Guarino *et al.*, 1995). There are limitations in getting the required number of samples especially in vegetatively propagated taxa, RET taxa (rare, endangered and threatened), cucurbitaceous vegetables consisting big fruits hence cannot be handled effectively. In such cases, selective or targeted sampling strategy should be adopted.

Prioritization of taxa, collecting for the gene bank curators, researchers and breeders assume paramount importance. General collection methods suggested by Guarino *et al.*, (1995) are in place and being followed but multiplications of germplasm is necessary for the desired quantity to deposit in national gene bank. About 50-100 plants per site needs to be sampled with sites



Fig. 1: The eight phyto-geographical regions of India

representing environmental heterogeneity and as much as possible effort should be done to bulk the samples collected from different sites.

Biased sampling is carried out in specific case belonging to rare, endangered and threatened species, rare variant, etc. In case of targeted collecting for plants/populations identified for particular traits, separate sample should be collected from specific agroecological areas/sites known to or thought of possessing such traits including unique variants (typical collecting strategy of breeders). This presupposes that this germplasm has been screened thoroughly for traits under consideration. For collecting the germplasm dealt in this book under various categories viz. trait-specific germplasm, new species, taxa collected from new area of distribution and potential species, the following methods can be adopted:

- Biased sampling needs to be done from selected/single plant, if shows distinctiveness.
- Sometimes same plant may have diverse types of material, should be collected separately and validated through grow out test.

- Folk taxonomy and decoding of cultivar name/vernacular name in case of landraces needs to be understood to know the trait/specific feature adhere to the collected germplasm.
- Characters and associated knowledge on use needs to be recorded to confirm its identity and PGR value.
- Germplasm of trait-specific, unknown but useful/unique material if collected with less seed quantity should be sent for multiplication and study of important characters.
- To collect sufficient material for study/research, gather germplasm from larger population (diverse patches/areas) of small size and pool collected seeds/propagules.
- Maturity indices (the sign or indication of readiness of material) needs to be recorded for collecting material timely as the stage of maturity influence the storage life and quality of material.
- Large number of herbarium specimens of unknown/useful plant/wild relatives, etc. needs to be prepared for identification.
- Ethnobotanical information/ traditional knowledge/indigenous knowledge and vernacular names of unknown material having PGR value needs to be recorded and validated through repeated visits and interaction with local inhabitants.

TRAIT- SPECIFIC GERMPLASM

During exploration, identification of trait-specific germplasm is a very cumbersome and skillful task. It needs deep observations on differentiating the germplasm of common accessions for its uniqueness, which may be apparent or requires validation through associated knowledge and experimental evidence. Information recorded during interaction with the farmers/locals regarding traits of the interesting material is further validated through other available evidences using morphological or biochemical characterization following standard procedures. In this entire process, background data from the published literature is considered the foremost level for authentication. Such material through detailed evaluation can be used in crop improvement programme. Twelve trait specific germplasm belonging to 10 crops/taxa (in the form of landraces/germplasm) are presented among the prioritized one, details are as follow:

- ‘Harkul’ (*Oryza sativa*) landrace from parts of West Bengal identified for low phytic acid, which is a major anti-nutritional component.
- *Oryza sativa* landraces (Bhainsa lot, Zadan, Anjani, Kalanamak, Dhanian dhan, etc.) collected from flood prone areas of Eastern Uttar Pradesh as a source of gene for submergence tolerance.
- Aromatic rice (*Oryza sativa*) landraces from West Bengal collected with traits early types, disease resistance, other than aroma.
- Multi-cob maize (*Zea mays*) from Nagaland and Mizoram identified with high number of ears/plant (germplasm also registered).
- Wild relatives of wheat and barley from cold desert identified for cold tolerance and other biotic and abiotic traits.
- Wild Triticeae (*Elymus* & *Leymus*) and wild relative of wheat (*Aegilops tauschii*) from cold desert of Jammu & Kashmir and a source of potential gene for drought, disease and pest resistance for breeding programmes.
- ‘Arya’ (*Cucumis melo* var. *albarensis*) from parts of Alwar (Rajasthan) and Rewari (Haryana) identified for drought tolerant and virus resistant trait.
- Cucumber (*Cucumis sativus*) from Mizoram and Manipur states of north-eastern region, India with carotenoid rich orange coloured flesh which is a source of Vitamin A.
- ‘Soh-phlong’ [*Flemingia procumbens* (syn *Moghania vestita*)] which is an under-utilized tuber crop is from Meghalaya and identified for nematocidal property.
- Lentil (*Lens culinaris*) landrace from Rajasthan identified with very distinct funiculus on the seed coat and deep roots in seedling with potential for higher rate of water uptake, considered drought tolerance/resistance.
- Green seeded coriander (*Coriandrum sativum*) landrace from Ashok Nagar and Guna districts of Madhya Pradesh having rich aroma and suitable for using in beverage industry.
- Wild mustard (*Brassica tournefortii*) from parts of Haryana and Rajasthan with potential for drought and aphid resistance.

Aegilops tauschii Coss.

Family	:	Poaceae
Common name	:	Tausch's goat grass
Accession/Identifier No.	:	IC628102, IC628103
Locality of collection	:	Budgam and Srinagar districts of Jammu and Kashmir
Biological status	:	Wild



Photo Courtesy: Dr. M Sultan Sheikh, NBGR RS, Srinagar (J&K)

Remarks: An annual grass with slender spikes; culms often densely tufted, 30-40 cm tall; spikes 5-7 cm long (excluding awns), with 9-11 or less spikelets. It grows in open dry grasslands, moderately disturbed sites, roadsides, and edges of cultivation. Its germplasm was collected for the first time from Budgam and Srinagar districts of Jammu and Kashmir.

Fl. & Fr.: July-September

Uniqueness: A potential gene donor for drought, disease and pest resistance. It has contributed the D genome to common wheat.

Source: Sultan *et al.* (2021)

Brassica tournefortii Gouan

Family	:	Brassicaceae
Common name	:	Wild turnip, Asian mustard
Vernacular name	:	Punjabi rai, Sarsyon
Accession/Identifier No.	:	IC560711, IC560714, HS19875
Locality of collection	:	Alwar, Jhunjhunu, Sikar and Bikaner districts in Rajasthan
Biological status	:	Landrace/Semi wild



Remarks: Annual herb with moderately well-developed basal rosette of leaves. This species is distributed in dry tracts of border areas of western India with high concentration of diversity mainly on parched sand dunes. It was reported to be as a rabi season oilseed crop but now vanishing from here.

Uniqueness: Exhibits tremendous potential for aphid resistance, Alternaria blight, white rust and drought.

Source: Singh *et al.* (2015)

Cucumis sativus L.

Family	:	Cucurbitaceae
Common name	:	Cucumber, Common Cucumber
Vernacular name	:	Fanghma, Hmazil (Mizoram)
Accession/Identifier No.	:	IC420405, IC420422, AZMC-1, KP1291
Locality of collection	:	Mamit (Mizoram); Imphal east (Manipur)
Biological status	:	Landrace



Remarks: The orange fleshed cucumber, a source of vitamin A was collected from Mizoram and Manipur states of NEH region. Germplasm of cucumber from diverse localities was evaluated in two environments and found that carotenoid content of immature and mature fruits ranged from 4.08 to 8.21 and 22.99 to 54.84 ($\mu\text{g/g}$), respectively as compared to check variety Pusa Uday (2.54 $\mu\text{g/g}$). It is a famous vegetable consumed as salad and also cooked as vegetable.

Uniqueness: High carotenoid content in fruits

Source: Pragya *et al.* (2016)

Coriandrum sativum L.

Family	:	Apiaceae
Common name	:	Coriander
Vernacular name	:	Kumbhraj, Mithi dhana(MP)
Accession/Identifier No.	:	IC631415, IC631428
Locality of collection	:	Ashok Nagar and Guna districts, Madhya Pradesh
Biological status	:	Landrace



Remarks: Early maturing landraces namely ‘Kumbhraj’, ‘Mithi dhana’ and ‘Kudi dhana’ collected from Madhya Pradesh were identified as good source of aroma, have high demand in beverage industry, hence are fetching good price (Rs.10,000 to 12,000 per 100 kg) in local ‘Mandis’/markets located at Ashok Nagar, Shivpuri, Guna and Kumbhraj areas of Madhya Pradesh.

Uniqueness: Aroma rich green seeded landraces/genotypes. The farmers have developed indigenous drying method for processing of “aroma rich green seeds”, using traditional knowledge.

Source: Semwal *et al.* (2019)

Cucumis melo L. var. *alwarensis* A. Pandey and S. Rajkumar

Family	:	Cucurbitaceae
Common name	:	Melon
Vernacular name	:	Arya
Accession/Identifier No.	:	AP/PM-2018, HS24385, HS24583 (Paratype)
Locality of collection	:	Farmer's field, Alwar, Rajasthan
Biological status	:	Landrace



Remarks: A less-known landrace of vegetable melon. Area of its cultivation is reported first time. It has morphological resemblance to snake melon (only at salad stage) and the common cucumber (*Cucumis sativus*) for taste at vegetable stage. The fruit crunchiness was noted to be closer to common cucumber, flesh with strong external and internal aroma. Fruits ob-cylindric, elongated to variously curved, mature fruits with musky aromatic flesh. Fruits edible as salad, vegetable and dessert.

Fl. & Fr.: June-August

Uniqueness: Drought tolerant and virus resistant genotype. Taxonomically identified with new name.

Source: Ahlawat *et al.* (2018)

Wild Triticeae (*Elymus* spp., *Leymus* spp.) genepool

Family	:	Poaceae
Common name	:	Wild wheat and barley
Accession/Identifier No.	:	IC611842, IC 611845, IC611850, IC611852, IC611854
Locality of collection	:	Leh district (Ladakh region) of Jammu & Kashmir
Biological status	:	Wild



Remarks: Tribe Triticeae covering wild relatives of wheat and barley (*Elymus*, *Hordeum* and *Leymus* species incl. *E. longearistatus* subsp. *canaliculatus*), distributed mostly in temperate and sub-temperate zones of the northern hemisphere. These wild relatives representing short-statured plants with short aristae. The entire tribe is often considered as a genepool with rather low barriers to hybridization and introgression.

Fl. & Fr.: July-September

Uniqueness: Species of *Elymus* and *Leymus* collected first time from Ladakh, which are potential source for biotic/abiotic stress tolerance traits.

Source: Pradheep *et al.* (2019)

Flemingia procumbens Roxb.

Family	:	Fabaceae
Common name	:	Soh-phlong
Vernacular name	:	Soh-phlong
Accession/Identifier No.	:	HS23047a, 23047b, IC-0627400, IC06274010, IC06274014
Locality of collection:	:	West & East Khasi hills (Meghalaya)
Biological status	:	Landrace



Photo Courtesy: Dr. Subarna Hazong, NBGR RS, Shillong

Remarks: *F. procumbens* Roxb. syn *Moghania vestita* (Baker) Kuntze that occurs wild in the humid tropical-subtropical regions of India, is the only edibles tuberous legumes among many which is grown as an underutilized minor food crop in small pockets in Khasi and Jaintia hills of Meghalaya. It is a perennial herb with densely pubescent, highly branched prostrate stem and dark to pale yellow tuberous roots. The tubers are widely used and sold by the native tribal population, who also consume the tuberous roots for their anthelmintic properties.

Fl. & Fr. : July-December

Uniqueness: Nematocidal property identified in tubers. This tuberous legume also grows as wild in mountainous slopes of Western Himalaya.

Source: Gawade *et al.* (2019)

Lens culinaris Medik.

Family	:	Fabaceae
Common name	:	Lentil
Vernacular name	:	Masoori dal
Accession/Identifier No.	:	IC317520
Locality of collection	:	Alwar, Rajasthan
Biological status	:	Landrace

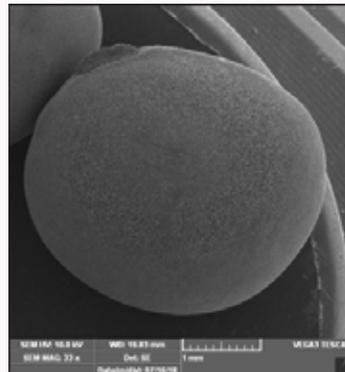


Photo Courtesy: Drs. Kuldeep Tripathi and Gayacharan, NBPGR, New Delhi

Remarks: A very distinct accession of lentil identified as unique seed morphotype with prominent feature on the seed coat collected from Rajasthan, deserves for detailed study to explore its genetic resource potential. Microscopical examination of seed of this typical lentil done and found that it has intact funiculus, is responsible for fast water uptake.

Uniqueness: Potential material for drought conditions.

Source: Tripathi *et al.* (2019)

Oryza sativa L.

Family	:	Poaceae
Common name	:	Paddy
Vernacular/cultivar name	:	Harkul
Accession/Identifier No.	:	IC619253, DPS/OPD-181
Locality of collection	:	Dakshin Makhberia, South 24 Praganas district (West Bengal)
Biological status	:	Landrace



Remarks: Rice landraces collected from West Bengal were biochemically analyzed for nutritional properties. Among these, a landrace was identified with low phytic acid (a major anti-nutritional component). It has reddish tinge husk and is also popular among the local people due to aroma and taste. Hence, this landrace would form base material to breed nutritionally improved cultivars of rice.

Uniqueness: ‘Harkul’ Low phytic acid (0.52 g/100g) containing genotype identified.

Source: Semwal *et al.* (2016)

Oryza sativa L.

Family	:	Poaceae
Common name	:	Paddy
Vernacular/cultivar name	:	Mansada, Bhainsa lot, Kalanamak, Dhania dhan
Accession/Identifier No.	:	IC622642, IC623258, IC622648, IC623264
Locality of collection	:	Eastern Uttar Pradesh
Biological status	:	Landraces



Remarks: Among the rice landraces collected from flood prone areas of Eastern Uttar Pradesh, some of them namely *Anjani*, *Kalanamak*, *Dhania dhan*, *Karangi*, *Santokhia*, *Madbukar*, *Ghar bharamva*, *Gadaria* were considered unique due to having specific traits. Though the tarai area of eastern UP is affected every year with flood but is known for long history of cultivation of traditional rice landraces. Some part of this rice growing area is prone to prolonged flooding.

Uniqueness: Landraces with submergence tolerance and lodging resistant traits were collected.

Source: Rathi *et al.* (2018)

Oryza sativa L.

Common name	:	Paddy
Vernacular name	:	Dhan
Accession/Identifier No.	:	IC597669, IC597678, IC598079, IC598080
Locality of collection	:	Dakshin, Uttar Dinajpur and Malda districts (West Bengal)
Biological status	:	Landraces



Remarks: Aromatic rice landraces having distinct traits and uses have been validated for the trait which were collected from West Bengal. The popular landrace like *Magur sali* is used for preparation of kheer because of its unique taste; and *Chini sakkar* (little sweet in taste) is used during religious ceremonies. Some of the important rice-based products prepared in the area were rice pudding (Payesh), rice cakes (Pithe), rice milk, rice flour, puffed rice (Khoi), parched rice (Muri) and pressed or flaked rice (Chira).

Uniqueness: Germplasm with aroma rich trait and most preferred landraces collected.

Source: Semwal *et al.* (2014)

Zea mays L.

Family	:	Poaceae
Common name	:	Maize
Vernacular name	:	Vaimin/Puakzo (Mizoram)
Accession/Identifier No.	:	IC524594, IC611490, MCM-11/01, MZM-31
Locality of collection	:	Zubza village, Kohima (Nagaland); Haurang village, Lunglei district, Mizoram
Biological status	:	Landrace



Remarks: Maize germplasm including genotypes collected from Mizoram and Nagaland were evaluated in isolation for two consecutive years at NBPGR Regional Station, Umiam. Among them, an accession with high (3.4) number of ears/plants was identified.

Uniqueness: The high yielding multiple cob accession (MCM-11/01) was registered as genetic stock (INGR-13054).

Source: Misra *et al.* (2012)

Globally, discovery of a species new to science is an exciting and continuous event, that reflects the ever-evolving biodiversity yet to be explored by scientists (BSI, 2020). In the field of plant genetic resources, during collection the explorers visit diverse areas in search of unique material when they may come across with types of PGR value that have not been encountered earlier and scientifically described. After field study, taking significant observations on notable and distinct characters of the same is compared with the one already known to them by virtue of his/her knowledge base on plant identification and taxonomy. Hence, the entire process needs critical scrutiny for establishing the status as “distinct variant”, “form”, or “taxon”.

Many new species were described during the explorations undertaken in the diversity rich areas of the country in past four decades (Pandey *et al.*, 2021).

The types described under genus *Abelmoschus* included *Abelmoschus angulosus* var. *mahendragiriensis* collected from Mahendragiri Hills, Gajapati district, Odisha; *A. enbeepegearense* from Mangalam dam, Palakkad, Kerala; *A. tuberculatus* from Saharanpur, Uttar Pradesh. Majority of ‘type’ taxa were represented from wild habitats collected through explorations undertaken in diversity rich areas. *A. angulosus* var. *mahendragiriensis* reportedly occurring in restricted habitats was a wild gathered species used for tender fruits and leaves locally consumed by the Saura tribe of the Mahendragiri hills in Odisha. *A. enbeepegearense* was a distant wild relative of cultivated okra and more closer to ambrette (*A. moschatus*). It is cultivated for tender edible fruits.

Abelmoschus tuberculatus, a wild relative of cultivated okra (*Abelmoschus esculentus*), and the first taxon described from the ICAR-NBPGR (then IARI) was collected from Saharanpur, Uttar Pradesh. The seeds were originally grown and the species was studied in the Plant Introduction Division, at Indian Agricultural Research Institute, New Delhi. The taxon is well known for its potential as progenitor for transforming genes to other related species, resistance to spiny bollworm, and Yellow Vein Mosaic Virus.

The ‘type’ specimens included under Cucurbitaceae include *Herpetospermum operculatum* collected from wild habitat of South district of Sikkim; and *Momordica cochinchinensis* subsp. *andamanica* from Adazig, Middle Andaman, A & N Islands. However, *Cucumis melo* L. var. *ahwarensis* was a cultigen studied in the farmer’s field, Alwar, Rajasthan. *Momordica* x *suboica* was a synthetic hybrid developed at ICAR-NBPGR regional station Thrissur, Kerala. *Herpetospermum operculatum* locally called ‘chippatta’ was recorded for use of tender leaf twigs as leafy vegetable; it was also sold in the markets of Nagaland. *Cucumis melo* L. var. *ahwarensis*, a species allied to the snake melon (*Cucumis melo* subsp. *melo* var. *flexuosus*) was under restricted cultivation for use as edible fruits as salad, vegetable and dessert (semi-mature). *Momordica cochinchinensis* subsp. *andamanica* and *Momordica* x *suboica* were used as fruit or as vegetable in respective areas of their type locality. *Trichosanthes dunniana* subsp. *clarkei* is a distant wild relative of snake gourd and was distributed in North-eastern Hill Region (NEH).

Over seven taxa represented among the ‘type’ collections in the NHCP were collected during various collection missions represented the genus *Curcuma*. ‘Type’ collection details are- *Curcuma amada* var. *glabra* from Nemom, Trivandrum (now Tiruvanthapuram), Kerala; *C. malabarica* from Pavaratty, Thrissur, Kerala; *C. nilamburensis* from Punnampavambu, Thrissur, Kerala; *C. karnatakensis* from West Hirahalli, Uttara Kannada district, Karnataka; *C. thalakaveriensis* and *C. kudagensis* from Kudagu (Coorg) district, Karnataka; and *C. longa* var. *vanabharidra* from Araku Valley, Visakhapatnam, Andhra Pradesh.

Curcuma amada var. *glabra* is wild relative of mango ginger (*C. amada*) with high starch contents in tubers. *C. malabarica* resembles *C. caesia*, had tubers eaten as substitute for arrow root. *Curcuma karnatakensis* closely related to *C. albiflora*, *C. longa* var. *vanabharidra* now synonym of *Curcuma longa* L. was rare in occurrence in type locality. *C. kudagensis* was allied to *C. neilgherrensis*, *C. nilamburensis* closely resembling *C. kannanorensis*. *C. thalakaveriensis* is closely related taxa to *C. coriacea* (synonymised under *C. kudagensis*).

Among ‘type’ material, *Piper pseudonigrum* was collected from the Silent valley, Palakkad, Kerala. This taxon is now rechristened as *Piper velayudhani*. *Vigna konkanensis* was reported from Ratnagiri, Maharashtra is a wild relative of *Vigna radiata* (green gram). The taxon has affinity to wild taxon, *V. hainiana* and *V. sublobata*.

The present chapter deals with 19 notable taxa among the new species/cultivated types (11) and wild relatives (8) that were collected as botanical specimens and germplasm under two categories: a) new species described recently; and b) new species described and type specimens available as herbarium specimens.

Allium negianum

A Pandey, KM Rai, PK Malav and S Rajkumar

Family	:	Amaryllidaceae
Common name	:	Wild Allium
Vernacular name	:	Phran, Jambu, Sakua, Sungdung, Kacho (Uttarakhand)
Accession/Identifier No.	:	KMR/AS/02/19, HS24506 (holotype)
Locality of collection	:	Sumna & Niti valleys near Malari glacier meadows
Biological status	:	Wild also cultivated



Remarks: *A. negianum* occurs mostly in wild habitats but also found under cultivation. The species was previously mistaken for identity as *A. stracheyi* in many published records (also confused and referred as *A. auriculatum*, *A. przewalskianum*) due to morphologically similarity of the outer tunic and use of leaf. Plant has strong onion-garlic aroma; hence leaves are used as a seasoning spices and condiments.

Flowering: June-September

Uniqueness: Reported as new species from India, also cultivated on higher reaches upto 4200 of Uttarakhand.

Source: Pandey *et al.* (2021)

Abelmoschus angulosus var. *mahendragiriensis*
RC Misra and DR Pani

Family	:	Malvaceae
Common name	:	Wild okra
Vernacular name	:	Bana Bhendi/Kanta Bhendi (Odisha)
Accession/Identifier No.	:	IC0619151, RCM-1224, RCM/LKB/23, HS22810
Locality of collection:	:	Mahendragiri Hill, Gajapathi district, Odisha
Biological status	:	Wild



Photo Courtesy: Dr. RC Misra, NBGR RS, Cuttack

Remarks: A woody bristled shrub with very attractive flowers and fruits was explored in a gorge between steep mountains of the Mahendragiri hills in the Eastern Ghats of India. It superficially resembles *A. angulosus* var. *purpureus*, however, striking differences in having larger leaves, small sized petals, narrowly conical to oblong beaked capsules and reniform seeds with brown trichomes were conspicuous. Tender fruits and leaves gathered from wild are locally consumed by the Saura tribe of the Mahendragiri hills in Odisha.

Fl. & Fr.: November-December

Uniqueness: Reported as new taxonomical variety from India, fruits and leaves are edible.

Source: Misra *et al.* (2018)

Abelmoschus enbeepeegearens

KJ John, Scariah, Nissar, KV Bhat and SR Yadav

Family	:	Malvaceae
Common name	:	Wild okra
Accession/Identifier No.	:	IC582757, JRNR/09-25, HS21417
Locality of collection	:	Nilgiri Biosphere Reserve (Tamil Nadu); Nelliampathy Hills in Palakkad (Kerala)
Biological status	:	Wild



Remarks: Distant wild relative of cultivated okra. *A. enbeepeegearens* occurring at low elevations was collected from Western Ghats. Morphologically it is allied to *A. moschatus* subsp. *moschatus*, *A. moschatus* subsp. *tuberosus* and *A. crinitus*, but easily distinguishable by virtue of its orthotropic branching, 3-5 angled leaves, glandular hairy plant body with whitish waxy secretions and glandular non-setose epicalyx segments. It can be crossed with all above-mentioned taxa with varying degree of success, but the hybrids are sterile. Tender fruits are edible.

Fl. & Fr.: August-November

Uniqueness: Reported as a new species from India, endemic to Western Ghats.

Source: John *et al.* (2013)

Abelmoschus pungens
var. *mizoramensis* KJ John, Krishnaraj and K Pradheep

Family	:	Malvaceae
Common name	:	Wild okra
Vernacular name	:	Ban Bhendi
Accession/Identifier No.	:	IC624222, JJk-2011/3 & JJk-2011/1; HS24043 (Holotype)
Locality of collection	:	Bairavi & Tuithveng, Kolasib, Mizoram
Biological status	:	Wild



Remarks: This plant was collected from Mizoram. The taxon resembles with *A. pungens* var. *pungens*, but distinguished by flowers in rosette appearance at the top, ovate or elliptic-lanceolate epicalyces, without keel, covering less than half the length of broad-based fruit. Generally observed on the edges of secondary forests, roadsides, grasslands and forest slopes.

Fl. & Fr.: September-October

Uniqueness: Reported as new taxonomic variety from Mizoram, India. It is resistant to Yellow Vein Mosaic Virus (YVMV) symptoms under experimental condition at NBPGR, RS Thrissur Kerala

Source: John *et al.* (2020)

Abelmoschus tuberculatus Pal and Har B. Singh

Family	:	Malvaceae
Common name	:	Wild okra
Vernacular name	:	Jangli Bhindi
Accession/Identifier No.	:	IW130, IW30A, ANV/18-1143, HS5280 (Holotype), HS5277 (Isotype)
Locality of collection	:	Saharanpur (Uttar Pradesh); Sewah, Panipat (Haryana)
Biological status	:	Wild



Remarks: A close relative of okra. Studies on cytological evidences and crossability studies between *A. esculentus* and *A. tuberculatus* have suggested that one of the parents to be *A. tuberculatus*. An annual, tall herb, stems hollow, strigose with simple hairs, leaves 5-7 lobed, corolla whitish-yellow with deep purple blotches, fruit densely tuberculate, narrowly oblong with tapering blunt tip. Originally collected from Saharanpur, Uttar Pradesh.

Fl. & Fr.: September-November

Uniqueness: Reported as a new species from India, also reported distribution from Haryana. Resistant to spiny boll worm and Yellow Vein Mosaic Virus.

Source: Pandey *et al.* (2020)

Corchorus pseudo-olitorius Islam and Zaid

Family	:	Malvaceae
Common name	:	Wild jute
Vernacular name	:	Jangli jute
Accession/Identifier No.	:	HS22495
Locality of collection	:	Kambani village of Tirunelveli district (Tamil Nadu)
Biological status	:	Wild



Remarks: This species is added from southern part of India and Rajasthan. It is an annual, unbranched herb; flowers axillary, usually solitary; capsules cylindric, setulose, straight or slightly curved. The plant grows on somewhat black soil on the raised boundary of a rice and sugarcane fields and prefers moist localities. Among the eight *Corchorus* species found in India, *C. pseudo-olitorius* is considered very close to *C. olitorius* but differ in some characters from all other species.

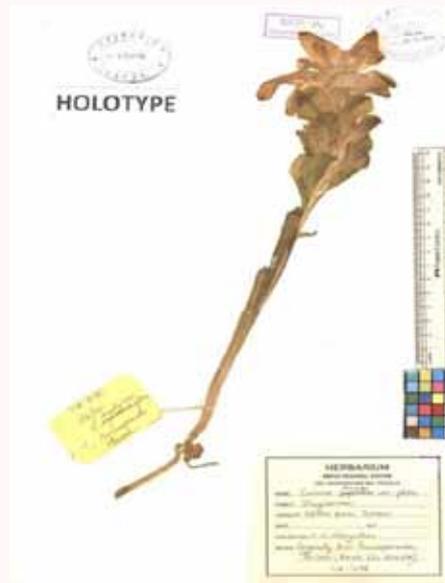
Fl. & Fr.: August-November

Uniqueness: Reported as a new species from India and close relative of jute.

Source: Mahapatra *et al.* (2003)

Curcuma amada
Roxb. var. *glabra* Velay., Unnikr., Asha and Maya

Family	:	Zingiberaceae
Common name	:	Wild turmeric
Vernacular name	:	Jangli Amahaldi
Accession/Identifier No.	:	IC266596 (Holotype), IC313101 (Isotype), V/91-Ca-1, HS17446 (Holotype), HS17868 (Paratype)
Locality of collection	:	Nemom, Trivandrum, Kerala
Biological status	:	Wild



Remarks: Wild relative of mango ginger (*C. amada*). Aerial shoots erect, leaves linear, semi-erect with closely arranged veins, purple-tinted; exserted coma bracts; rhizomes flesh light yellow and slightly acid and biting in taste.

Fl. & Fr.: September-October

Uniqueness: Reported as a new species from India. Higher content of starch reported in the species.

Source: Velayudhan *et al.* (2009)

Curcuma karnatakensis Amalraj, Velay. and Mural.

Family	:	Zingiberaceae
Common name	:	Wild turmeric
Vernacular name	:	Carnatic Curcuma/ Kaduarashine/Wild Turmeric
Accession/Identifier No.	:	IC329266,del HS8286 (Isotype); Amalraj 807
Locality of collection	:	West Hirahalli, Sirsi Uttar Kanada dist., Karnataka
Biological status	:	Wild



Remarks: It is an endemic species, closely related to *C. albiflora* Thw. Plant short, rootstock small, leaves reclinate, broadly ovate and closely veined; bracts green; coma absent; flowers white to rosy-white; lip 3-coloured (yellow, rose, white). It is abundant under the shade of teak trees.

Fl. & Fr.: September-November

Uniqueness: Reported as a new species from India.

Source: Amalraj *et al.* (1991)

Curcuma kshonapatra Vel.

Family	:	Zingiberaceae
Common name	:	Wild Turmeric
Vernacular name	:	Jangli haldi
Accession/Identifier No.	:	HS15288 (Holotype)
Locality of collection	:	Udipi, Karnataka
Biological status	:	Wild



Remarks: Plant erect, rootstock conical-cylindrical, happened to be distinct from its close alike *Curcuma albiflora* Thwaites in having tall thin plant type, leaf lamina with purple mid-rib, dark purple spikes, highly exserted and showy flowers, is being therefore reported as a new species del.

Fl. & Fr.: August-October

Uniqueness: Reported as a new species from India. Rare in occurrence.

Source: Velayudhan (2016)

Curcuma kudagensis Velay., VS Pillai and Amalraj

Family	:	Zingiberaceae
Common name	:	Wild turmeric
Vernacular name	:	Kaduarashine
Accession/Identifier No.	:	IC397703del, HS15291 (Isotype)
Locality of collection	:	Thalakkaveri, Coorg district, Karnataka
Biological status	:	Wild



Remarks: Close relative of turmeric; resembles *C. neilgherrensis* Wight. Very long fusiform root tubers, lax inflorescence, smaller and fewer coma bracts, fertile bracts pale yellow-green with purple tip, highly exerted flower with bright yellow corolla, deeply lobbed labellum, anthers deep yellow.

Flowering: April-May

Uniqueness: Reported as a new and endemic species from India.

Source: Velayudhan *et al.* (1999)

Curcuma longa* var. *vanaharidra
Velay., SR Pandravada, JK George and KS Varaprasad

Family	:	Zingiberaceae
Common name	:	Wild turmeric
Vernacular name	:	Van-haldi
Accession/Identifier No.	:	IC360212, HS18852 (Holotype), SJ-4055, NBGR/TCR No. 1306
Locality of collection	:	Aruku Valley, Visakhapatnam, Andhra Pradesh
Biological status	:	Wild



Remarks: Close relative of turmeric. Rhizome with light orange cortex and darker core, palmately branched, flesh mildly scented, slightly acrid, spike central, floral bracts whitish-green, coma bracts whitish with light pinkish tint towards top; flower shorter than bract or equal, calyx and corolla whitish to cream, anther horizontally placed, white, stigma white, highly protruding.

Flowering: July-August

Uniqueness: Reported as a new species from India. Rare in occurrence. Very distinct from *C. longa* though considered a synonym.

Source: Velayudhan *et al.* (2009)

Curcuma malabarica Velay., Amalraj and Mural.

Family	:	Zingiberaceae
Common name	:	Wild turmeric
Vernacular name	:	Van haldi
Accession/Identifier No.	:	HS7616 (Isotype)
Locality of collection	:	Pavaratty, Thrissur, Kerala
Biological status	:	Wild



Remarks: Rhizome ovate-spherical, whitish grey flesh, tubers sessile, grey-light blue; strongly aromatic and bitter; leaves elliptical ovate, glabrous, purple streaked upto half portion, fading at maturity; inflorescence appearing before or along with leaves, purple, flowers equal to bracts and petals being light pinkish white-pale reddish white; anther basal spur curved and pointed. Resembles *C. caesia* Roxb. Frequently growing in sandy costal belt of Kerala.

Flowering: May-June

Uniqueness: Reported as a new species from India. Rhizomes eaten as substitute for arrowroot.

Source: Velayudhan *et al.* (1990)

Curcuma thalakaveriensis Velay., Amalraj and Mural.

Family	:	Zingiberaceae
Common name	:	Wild turmeric
Vernacular name	:	Kadu koova
Vernacular name	:	Wild Curcuma,
Accession/Identifier No.	:	IC248164; HS8228 (Isotype); V-3561
Locality of collection	:	Coorg district, Karnataka
Biological status	:	Wild



Remarks: Closely related to *C. coriacea*. Herb with purple pseudo-stem, rhizome ovoid, lateral tubers absent, tubers fusiform; leaves lanceolate softly pubescent on both sides, inflorescence lateral and central; coma few, pale greenish white with pink tip; fertile bract triangular; flower longer than bracts, calyx translucent, pink streaked, minutely hairy outside; petal purple dotted, pale yellow and purple tip, lateral lobes cream; staminodes bright yellow. Occurs on rocky crevices.

Flowering: January-February

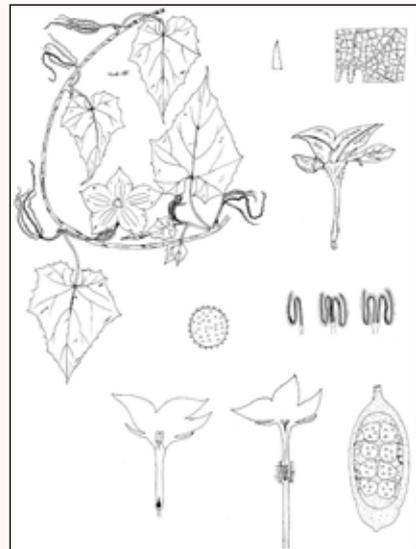
Uniqueness: Reported as a new species from India.

Source: Velayudhan *et al.* (1991)

Herpetospermum operculatum

K Pradheep, A Pandey, KC Bhatt and ER Nayar

Family	:	Cucurbitaceae
Vernacular name	:	Chi-patta
Accession/Identifier No.	:	KP1449, HS21356 (Isotype)
Locality of collection	:	Sadam, South Sikkim (Sikkim), Mesulumi, Phek (Nagaland)
Biological status	:	Wild



Remarks: Its occurrence reported in north-eastern India. One of the collectors confused this for a species of *Luffa* hence due to its fruit and seeds, was investigated for new taxon. *H. operculatum* is an annual, dioecious climber; stems slender, young shoots densely pubescent; tendrils 4-fid; leaves highly strigose-pubescent at juvenile stage; flowers showy, bright yellow, fragrant; fruits oblong to ellipsoid-fusiform with 6-7 irregular stripes, seed compressed, \pm round with irregular acute erose margin. The tender leaf twigs used as leafy vegetable, sold in markets.

Fl. & Fr.: September-November

Uniqueness: Reported as a new species from India, edible value also reported first time.

Source: Pradheep *et al.* (2014)

Momordica cochinchinensis
subsp. *andamanica* KJ John, YC Roy and Krishnaraj

Family	:	Cucurbitaceae
Common name	:	Wild spine gourd
Vernacular name	:	Jangli karela
Accession/Identifier No.	:	IC567226, JAS/08-02, HS22673 (Isotype), HS22672 (Paratype)
Locality of collection	:	Adazig, Mohanpur, Mayabhandar, Middle Andaman, A& N Islands
Biological status	:	Wild



Remarks: A crop wild relative of spine gourd; unripe fruits used as vegetable. The taxon is evolved in isolation in Middle Andaman Island; herbaceous perennial climber, over 9-12 m high, dioecious with orange yellow flowers and fruit prolate in shape. It is distributed throughout Middle Andaman Islands and is occasionally spotted along Grand trunk road connecting Port Blair (South Andaman) with Diglipur (North Andaman).

Fl. & Fr.: August-December

Uniqueness: Reported as a neo endemic species from India. Unripe fruits as vegetable.

Source: John *et al.* (2018)

Momordica sahyadrica
subsp. *anamalayana* KJ John, K Pradheep et Krishnaraj

Family	:	Cucurbitaceae
Common name	:	Wild spinegourd
Vernacular name	:	Jangli karela
Accession/Identifier No.	:	JJK/99-587, HS (Isotype)
Locality of collection	:	Parambikulam Wildlife Sanctuary & Nelliampathy Hills Palakkad (Kerala)
Biological status	:	Wild



Remarks: The species is close to *M. sahyadrica* subsp. *sahyadrica*. Plant is herbaceous, tendrillar climber, dioecious, stem slender, angular, flowers axillary, solitary or in a loose fascicle; corolla bright yellow, fruits ovoid, turning bright orange on ripening. It has a delicate growth habit with niche-specificity, occupying the evergreen forest floor in the Western Ghats. It is used as a vegetable by forest dwelling tribes *Mannan* and *Muthuvan* of Kerala and elsewhere in the Western Ghats.

Fl. & Fr.: June-November

Uniqueness: Reported as a new species to India. A narrow endemic taxon to southern Western Ghats.

Source: John *et al.* (2020)

Piper pseudonigrum (Vel.) ex ESS Kumar and SP Mathew

Family	:	Piperaceae
Common name	:	Wild black pepper
Vernacular name	:	Kattukurumulagu
Accession/Identifier No.	:	IC360291, HS12772 (Isotype), AV 202
Locality of collection	:	Silent valley, Palghat, Kerala
Biological status	:	Wild



Remarks: Robust shrubby climber. Sparsely distributed male flowers on long light purple to purple colour spikes. Now this species is rechristened as “*P. velayudhani*” by Kumar *et al.* (2013) as being found as an illegitimate later homonym (of *P. pseudonigrum* C. DC. 1898). Closely resembles *P. nigrum* in habit and leaf morphology.

Flowering: February-April; **Fruiting:** December

Uniqueness: Reported as a new species from India.

Source : Velayudhan and Amalraj (1992)

Trichosanthes dunniana subsp. *clarkei*
K. Pradheep, subsp. nov.

Family	:	Cucurbitaceae
Common name	:	Wild snake gourd
Vernacular name	:	Indrayani
Accession/Identifier No.	:	KP2741, HS24213 (Isotype)
Locality of collection	:	Radong, near Ranipool, East Sikkim, Sikkim
Biological status	:	Wild



Remarks: A crop wild relative of snake gourd. It is a medium-sized perennial dioecious climber, and also similar to *T. dunniana* H. Lev. subsp. *dunniana* in various characters, but differs in greenish colour of bracts and calyces (vs red in subsp. *dunniana*), longer pedicels of staminate flowers, shorter calyx lobes, white stamin and pistillate flowers.

Fl. & Fr.: July-November

Uniqueness: Reported as a new species from India and endemic to northeastern hill region (Sikkim & foot hills of West Bengal).

Source: Pradheep *et al.* (2021)

Vigna konkanensis

Latha, KV Bhat, IS Bisht, Scariah, KJ John and Krishnaraj

Family	:	Fabaceae
Common name	:	Wild Vigna
Vernacular name	:	Jangli dal
Accession/Identifier No.	:	IC277045, KP2741, HS21377 (Holotype)
Locality of collection	:	Ratnagiri, Maharashtra
Biological status	:	Wild



Photo Courtesy: Dr. M Latha, NBGR RS, Thrissur

Remarks: This species of the genus *Vigna* Savi of the Section *Ceratotropis* is closely allied to *V. hainiana* and *V. sublobata* but differs from both in having glabrous stem, stipule, leaflets and inflorescence, acute leaflets, immature pods without a pinkish spot at the apex, mature pods with sparsely short setose hairs and seeds rough with appressed concentric reticulations on testa. Distributed in the west coast of India.

Fl. & Fr.: August-November

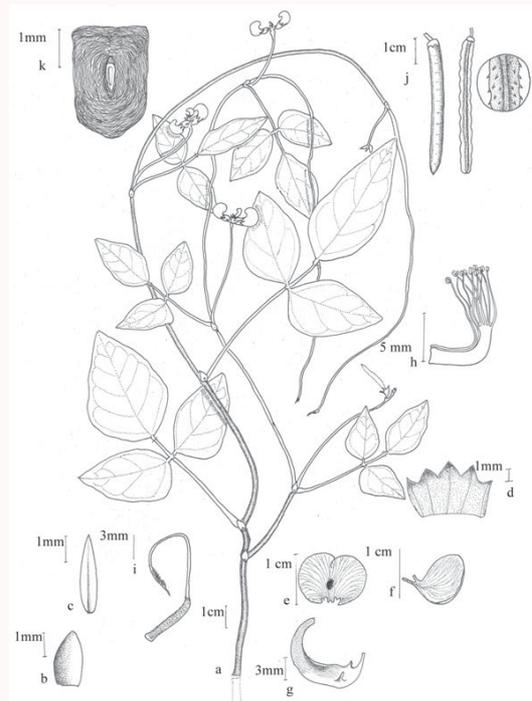
Uniqueness: Reported as a new species from India.

Source: Latha *et al.* (2014)

Vigna konkanensis

Latha, KV Bhat, IS Bisht, Scariah, KJ John and Krishnaraj

Family	:	Facaceae
Common name	:	Wild Vigna
Vernacular name	:	Jangli dal
Accession/Identifier No.	:	IC277045, KP2741, HS21377 (Holotype)
Locality of collection	:	Ratnagiri, Maharashtra
Biological status	:	Wild



Remarks: Holotype. Stem, leaflets, stipule and inflorescence glabrous; stipule ovate-elliptic; young pods without pinkish spot at apex; mature pods sparsely setose hairy; seeds with appressed reticulations on testa.

Fl. & Fr.: August-November

Uniqueness: Reported as a new species from India.

Source: Latha *et al.* (2014)

EXTENDED DISTRIBUTION RECORDS

In history of agriculture, plant species growing in wild have been identified for various uses to meet the human needs and only few selected ones have been domesticated (Pandey and Arora, 2004). The process of crop domestication is continuous involving selection by the human beings and identify crops suitable for need.

“Extended Distribution Records” in the present context has been discussed under two subheads: 1)“new distribution records” and 2)“new records on cultivation”. Occurrence of plant species under geographic localities beyond the demarcated state boundaries or eco-geographic zones (of wild species) and from wild habitat to human domain (cultivated types) are major criterion for demarcating the two types respectively.

Reports on occurrence of wild species in an area not mentioned in earlier literature results in identification of “new distribution records”. The “new distribution records” are not mentioned in the existing literature; the reason for missing these could be assigned due to ignorance of the plant species by previous explorers or invasion of the species to new habitats. For the “new records on cultivation” of a species in the present context is accounted for a potential wild species that has been selected and taken to human domain for use. Such new cultivated species are also defined as “neo-domesticates” or “de novo domesticates” of plant species and may be seen on the large-scale cultivation for commercial use or sale in the market (Heywood, 1999). Due course of selection for use by the human, potential species (wild useful/edible species) have been taken up into cultivation and frequently observed in and around human habitation, generally in the homesteads, kitchen garden or fellow protected areas. They may occur as “protected” types without showing much selection by them, may have been long domesticated and showing distinct forms. While collecting such germplasm, the study demands critical examination for changes in plant characters with the help of various tools like floristic, herbarium study and published literature from the region.

Recent climate change has become one of the main drivers of shifts in the geographical distributions of plant species (Oliver and Morecroft, 2014). There are several ways in which species can respond to climate change: adapt, move in different directions in order to track suitable climates (i.e. towards higher latitudes and elevations, or to the east and west), and go extinct in a worst scenario, globally. Responses of plant species will depend on their genetic diversity and ability to adapt to the magnitude and rate of climate change, as well as availability of space for species to move into local microclimates. Changes in geographical distributions of vegetation at the local and regional scales can impact community composition, ecosystem function, and genetic diversity, which can make plants even more vulnerable to on-going environmental change. Hence, we need a better understanding of species specially for individualistic responses to environmental change.

The Indian region being floristically rich, has been studied and through several extensive floristic explorations in the country and many new taxa have been rediscovered. Similarly, many restricted taxa have been newly reported from Indian states as their extended distribution (Pradheep *et al.*, 2017; 2019). Critical examination of the plant specimens and comparison with the earlier literature to confirm their extended distribution is necessary. During explorations and studies on herbarium specimens preserved in different herbaria of the country (BSI, NHCP, FRI, TBGRI, etc.) and global databases on plant diversity are normally practiced methods.

At NBPGR, the explorers have thoroughly explored the areas of extended distribution records and supported it through relevant literature. Keeping all these facts in mind, 24 taxa belonging to 18 genera were reported from new areas of distribution are as *Allium fasciculatum*, *Tubocapsicum anomalum*, *Fagopyrum gracilipes*, *Trichosanthes kerii*, *T. majuscula*, *Vigna angularis* var. *nipponensis* from Arunachal Pradesh; *Allium fasciculatum*, *Tupistra clarkei*, *Trichosanthes pilosa*, *T. majuscula* from Sikkim; *Momordica subangulata* subsp. *subangulata*, *Juglans sigillata*, *Caryota obtusa*, *Trichosanthes dicaelosperma* and *T. animalaiensis* from Nagaland; *Amaranthus hybridus*, *Abelmoschus moschatus*, *Ziziphus oenopolia*, *Solanum virginianum*, *Corchorus aestuans*, *Bacopa monnieri* from Great Nicobar (A&N Islands); *Stablianthus involucratum*, *Vigna angularis* var. *nipponensis* from Mizoram; *Trichosanthes majuscula* and *T. pilosa* from Assam; *Dioscorea piscatorum* from A&N Islands. Some plants like *Allium fasciculatum* are reported under cultivation as vegetable from Sikkim and Arunachal Pradesh (Pandey *et al.*, 2018) and *Tupistra clarkei* as vegetable from Sikkim.

Abelmoschus moschatus Medik.

Family	:	Malvaceae
Common name	:	Musk mallow, Musk dana
Vernacular name	:	Kastura bhenda
Accession/Identifier No.	:	HS23004, JP/17-35, HS23019, JP/17-13
Locality of collection	:	Vijay Nagar, Joginder Nagar (Great Nicobar), A&N Islands
Biological status	:	Wild also cultivated



Remarks: A wild relative of okra, native to Asia and Australia. *A. moschatus* is an annual or biennial hairy shrub, leaves very variable in size and shape, flowers large, showy, yellow, fruit is a dry, dehiscent capsule, many seeded. Cultivated as medicinal plant. In India the areas under cultivation are increasing and seeds are exported for oil extraction.

Fl. & Fr.: June -September

Uniqueness: New distribution record to Great Nicobar. Seed oil is highly valued in perfumery and aromatherapy.

Source: Pradheep *et al.* (2020)

Allium fasciculatum Rendle

Family	:	Amaryllidaceae
Common name	:	Wild Allium
Vernacular name	:	Shanu Dungdung (Sikkim)
Accession/Identifier No.	:	IC632224, HS21818
Locality of collection	:	Sikkim, Darjeeling, Arunachal
Biological status	:	Wild also cultivated



Remarks: It is a taxon of the Tibetan plateau which reported to occur in its natural habitat (sandy loose alluvial soil, stony meadows, dry slopes, cliffs, side of streams) between 4500-5500 m and also found under cultivation in Sikkim and Arunachal Pradesh. Annual herb, bulbs absent, leaves basal, flat, linear. The leaves used for vegetable and as backyard cultigens in lower altitude (1300-2600 m).

Flowering: July-September

Uniqueness: Its cultivation in North-eastern hill region is reported for the first time.

Source: Pandey *et al.* (2018)

Allium tuberosum Rottler ex Sprengel

Family	:	Amaryllidaceae
Common name	:	Indian leek, Oriental garlic
Vernacular name	:	Maroi Nakuppi, Bunga, Gandana
Accession/Identifier No.	:	IC353524, IC321643, KCB/AP/605, KP/ AP/701, HS8652, HS20315
Locality of collection	:	South and West Sikkim, Sikkim
Biological status	:	Wild also cultivated



Remarks: *Allium tuberosum* is native of Asia temperate and widely cultivated crop in temperate and tropical regions of world; also found naturalized. It has clustered cylindrical bulbs, arising from horizontal rhizome; leaves linear, flat ; umbel hemispheric-globose, many flowered, flowers white-pinkish white. Occurs in the Western Himalaya, also as semi-wild population (1,600-3,300 m). The plant has a distinctive mild flavor more like onion.

Flowering: July-November

Uniqueness: Less known cultivated vegetable in Indian Himalayan region. A potential cash crop in Nagaland and Manipur.

Source: Pandey *et al.* (2014)

Amaranthus hybridus L.

Family	:	Amaranthaceae
Common name	:	Green amaranth
Vernacular name	:	Chaulai
Accession/Identifier No.	:	HS23123
Locality of collection	:	Campbell Bay, Great Nicobar (A & N Islands)
Biological status	:	Wild



Remarks: It is a wild relative of grain amaranth crops. *A. hybridus* is an erect annual herbaceous plant, leaves long-stalked, ovate to rhombic-ovate, flowers green, crowded into dense terminal panicle, seeds dark brown, shiny. Earlier distribution recorded in Himalaya and southern Indian hills. Leaves used as a green vegetable.

Fl. & Fr.: July-October

Uniqueness: New distribution record to Great Nicobar. Rare in occurrence.

Source: Pradheep *et al.* (2020)

Bacopa monnieri (L.) Pennell

Family	:	Scrophulariaceae
Common name	:	Water hyssop
Vernacular name	:	Brahmi
Accession/Identifier No.	:	HS23013, JP/17-69
Locality of collection	:	Campbell Bay, Sastry Nagar to Galathea, Great Nicobar (A&N Islands)
Biological status	:	Wild/ weedy form



Remarks: *Bacopa monnieri* is a medicinal plant cultivated in mainland India. It is a perennial, creeping herb, grows as wetland weed; leaves succulent, 4-6 mm thick, oblanceolate and are arranged oppositely on the stem; flowers small, white. It is used in Ayurvedic and traditional medicines to improve memory.

Fl. & Fr.: September-November

Uniqueness: New distribution record to Great Nicobar.

Source: Pradheep *et al.* (2020)

Caryota obtusa Griff.

Family	:	Arecaceae
Common name	:	Giant fishtail palm, Black trunk palm
Accession/Identifier No.	:	HS21765
Locality of collection	:	Mon, Nagaland
Biological status	:	Wild



Remarks: A large, solitary, 40 m high tree; trunk often swollen; leaves borne in compact crown at the top of trunk. Occurs wild and also planted under homestead cultivation. Distributed in Meghalaya, Assam, Arunachal Pradesh, Manipur.

Fl. & Fr.: This plant flowers only once after ten years.

Uniqueness: New distribution record to Nagaland. A fast-growing tree species.

Source: Pradheep and Soyimchiten (2016)

Corchorus aestuans L.

Family	:	Tiliaceae
Common name	:	East Indian Mallow
Vernacular name	:	Kalsa, Chunchu
Accession/Identifier No.	:	IC631166, AJJPN/19-184
Locality of collection	:	Campbell Bay, Sastry Nagar (Great Nicobar) (A&N Islands)



Remarks: The taxon is a wild relative of jute. Distributed throughout; pantropical. An annual much-branched herb, leaves ovate, serrate, inflorescence cymose, flowers yellow, capsules erect, stout, truncate, 6-angled, seeds truncate, dark brown. Its leaves are used as medicine and food.

Fl. & Fr.: August–October

Uniqueness: New distribution record to Great Nicobar. Occasional in wet areas in Great Nicobar.

Source: Pradheep *et al.* (2020)

Dioscorea piscatorum Prain & Burkill

Family	:	Dioscoreaceae
Common name	:	Fish-poison yam
Vernacular name	:	Okavu (Nicobari)
Accession/Identifier No.	:	JPJ/18-70, JPJ/18-72 (live collection at NBPGR RS Thrissur), HS23104
Locality of collection	:	Pulopanja, Little Nicobar, Katchal & Teressa islands (A & N Islands)
Biological status	:	Wild also cultivated



Remarks: A perennial climber, tubers branched, conspicuously spiny throughout, arising from stem base just below soil surface and seated horizontally. Nicobarese excavate the young tubers from the wild for edible use. They use to protect this species in the wild and also cultivate in cleared uplands, for which pieces of matured tuber is planted in the soil.

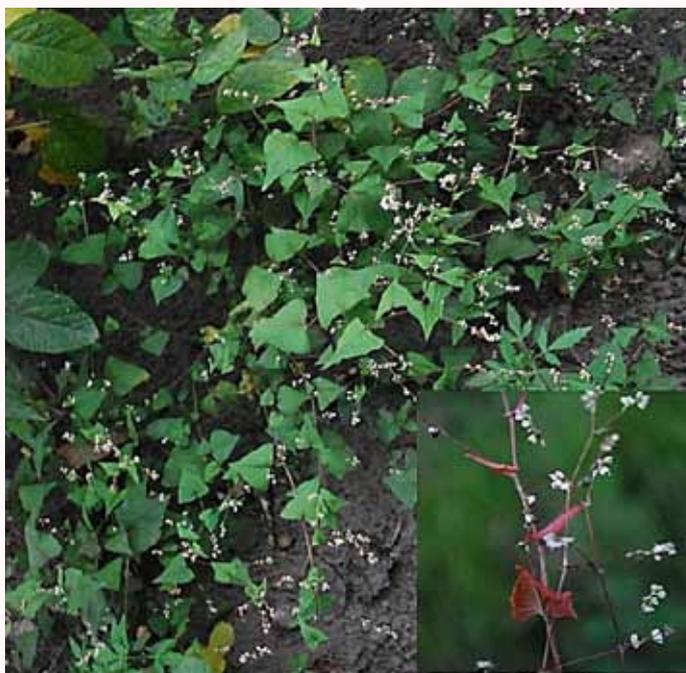
Fl. & Fr.: Septemebr-December

Uniqueness: New distribution record to A&N Islands.

Source: Pradheep *et al.* (2019)

Fagopyrum gracilipes (Hemsl.) Dammer ex Diels

Family	:	Polygonaceae
Common name	:	Wild buckwheat
Vernacular name	:	Thertheek (Arunachal Pradesh)
Accession/Identifier No.	:	IC622179, HS22855
Locality of collection	:	Sapkum, Anjaw (Arunachal Pradesh)
Biological status	:	Wild



Remarks: The species is closely related to the diploid outcrossing species *F. capillatum*, and only distantly related to the cultivated species, buckwheat (*F. esculentum* and *F. tataricum*). It was found growing as a weed in upland fields of buckwheat crops. The leaves are used as vegetable by the tribal community.

Fl. & Fr.: June-November

Uniqueness: New distribution record to Arunachal Pradesh.

Source: Pradheep *et al.* (2019)

Juglans sigillata Dode

Family	:	Juglandaceae
Common name	:	Wild walnut
Vernacular name	:	Akhojang
Accession/Identifier No.	:	HS21761
Locality of collection	:	Mon and Wokha districts (Nagaland)
Biological status	:	Wild



Remarks: Crossability and molecular studies indicated that this species is close relative of *J. regia*. It is a monoecious, woody, 25 m high tree with long ovate-lanceolate leaves and sub-globose fruits, 4 in a cluster. Generally found along streams and rivers and wet temperate forests. Locals collect the fallen nuts during October-November.

Fl. & Fr.: March-November

Uniqueness: Reported to be distributed in Sikkim, however new distribution is recorded in Nagaland.

Source: Pradheep *et al.* (2016)

Momordica subangulata Blume subsp. *subangulata*

Family	:	Cucurbitaceae
Common name	:	Wild spine gourd
Vernacular name	:	Jangli kankoda
Accession/Identifier No.	:	HS21664, HS214665, HS21666
Locality of collection	:	Kuthur, Tuensang district (Nagaland)
Biological status	:	Wild



Remarks: This species can be easily distinguished from the commonly available *M. subangulata* subsp. *renigera* on the basis of habit, flower colour, sepal apex, fruits length and fruit surface characteristics. It is a perennial herbaceous climber with angular-sulcate stem, solitary, deep yellow flowers in leaf axil, dark green, ovoid-ellipsoid, irregularly ribbed fruits. Found creeping on ground or climbing on bushes but also cultivated for its edible immature fruits by the tribal communities.

Fl. & Fr.: June-October

Uniqueness: Rare in occurrence. New record for India, reported from Nagaland.

Source: Soyimchiten *et al.* (2015)

Plukenetia corniculata Sm.

Family	:	Euphorbiaceae
Common name	:	Meetha patta
Vernacular name	:	Meetha patta
Accession/Identifier No.	:	IC 0614466
Locality of collection	:	Dhansiri, Karbi-Anglong district (Assam); Dimapur (Nagaland)
Biological status	:	Wild also cultivated



Remarks: The species was found under cultivation in homestead for vegetable across an entire village near Dhansiri in Karbi-Anglong (Assam). Though this species is reported to occur as wild in NE region but no previous report of its cultivation here. It is a twinning, monoecious liana with ovate-oblong, dark green leaves, terminal inflorescence, 4-horned capsule and mottled seeds.

Fl. & Fr.: July-September

Uniqueness: New domestication/cultivation as vegetable recorded from parts of Assam and Nagaland. Due to huge demand, being cultivated in large scale in Assam.

Source: Pradheep *et al.* (2015)

Solanum diphyllum L.

Family	:	Solanaceae
Common name	:	Two leaved nightshade
Vernacular name	:	Pili makoy
Accession/Identifier No:	:	HS22157
Locality of collection	:	Herbal Garden, Punjabi Bagh, Horticulture Department, New Delhi
Biological status	:	Wild



Remarks: This species was introduced as a garden plant in different continents, has tendency of widespread naturalization. It is an undershrub or shrub, leaves unequal, obovate-elliptic, flowers white, berries spherical, smooth, green and hard when young, mature into bright yellow to yellow orange. Earlier recorded from UP, MP, Bihar, West Bengal, Karnataka, Tamil Nadu, Maharashtra and Chhattisgarh. This species has ethnomedicinal value and ornamental value.

Fl. & Fr.: April-October

Uniqueness: New distribution record for flora of Delhi. It has tendency of widespread naturalization.

Source: Pandey *et al.* (2018)

Solanum virginianum L.

Family	:	Solanaceae
Common name	:	Thorny night shade, yellow berry night shade
Vernacular name	:	Kantkari
Accession/Identifier No.	:	HS23002
Locality of collection	:	Sastry Nagar to Galathea, Campbell Bay (Great Nicobar)
Biological status	:	Wild



Remarks: A wild relative of brinjal, however distributed almost throughout as weed. Plant is erect or creeping herb, copiously armed, leaves prickly along veins, leaf blade ovate, margin pinnately parted, lobes unequal, flowers blue-purple, sepal tube bell shaped, fruiting pedicel prickly, berry pale yellow. The plant has many medicinal properties, used mostly in India; fruits poisonous.

Fl. & Fr.: July-October

Uniqueness: New distribution record to Great Nicobar but is rare in occurrence.

Source: Pradheep *et al.* (2020)

Stahliaanthus involucratus (King ex Baker) Craib ex Loes.

Family	:	Zingiberaceae
Common name	:	Wild galangal
Vernacular name	:	Jangli Galangal
Accession/Identifier No.	:	IC278054, DMRK-52
Locality of collection	:	Kolasib district (Mizoram)
Biological status	:	Wild



Remarks: This species was collected under the name “*Curcuma* sp.” (owing to its superficial resemblance to *Curcuma* species). Plant is 40-50 cm high with strongly fragrant rhizome, leaves obovate-oblong, flowers white. The plant propagates through rhizomes, and adapts well under partial shade conditions. Rhizomes has medicinal value, are used in the treatment of inflammation and pain.

Fl. & Fr.: April-June

Uniqueness: New distribution record to Mizoram. Earlier reported from Assam, Meghalaya, Nagaland and West Bengal.

Source: Rathi *et al.* (2016)

Trichosanthes animalaiensis Bedd.

Family	:	Cucurbitaceae
Common name	:	Wild snakegourd
Vernacular name	:	Nepodal
Accession/Identifier No.	:	IC614505, KC/S/I-67, KP- 1263
Locality of collection	:	Meriema (Kohima), Nagaland; Lilong (Thoubal), Imphal East (Manipur)
Biological status	:	Wild



Remarks: This species is wild relative of snake gourd. *T. animalaiensis*, a robust dioecious climber with grooved stem, 2-3 fid tendrils, ovate-suborbicular and 3-5 lobed leaves, pale white fragrant flowers, globose fruits and angular seeds. Grows in evergreen broad-leaved forests up to 1,600 m.

Fl. & Fr.: April-September

Uniqueness: New distribution record to Manipur and Nagaland. Earlier reported from southern & peninsular region, Mizoram and Tripura.

Source: Pradheep *et al.* (2021)

Trichosanthes dicaelosperma CB Clarke

Family	:	Cucurbitaceae
Common name	:	Wild snake gourd
Vernacular name	:	Arol-Kappu (Arunachal)
Accession/Identifier No.	:	KC-H/61
Locality of collection	:	Mokokchung, Nagaland; Chipuli, Dibang Valley, Arunachal Pradesh
Biological status	:	Wild



Remarks: This taxon is a wild relative of snake gourd. Occasionally found in subtropical dense broad leaved forests; It is a dioecious twinning climber with long slender stem; 2-fid tendrils; cordate-ovate, shortly villose, unlobed leaves; globose orange-red fruits, scarlet-red pulp, dark-brown seeds.

Fl. & Fr.: May-September

Uniqueness: New distribution record to Nagaland. Earlier reported from Arunachal Pradesh, Sikkim, West Bengal and Meghalaya.

Source: Pradheep *et al.* (2021)

Trichosanthes kerrii Craib

Family	:	Cucurbitaceae
Common name	:	Wild snake gourd
Vernacular name	:	Okhapattechui
Accession/Identifier No.	:	KP 16-1
Locality of collection	:	Lalpani, Lohit, Arunachal Pradesh
Biological status	:	Wild



Remarks: A wild relative of snake gourd. Found in forest edges along streams. This is a dioecious gigantic perennial climber, tendrils 3-5 fid, leaves unlobed, cordate-ovate in outline, fruits ellipsoid, orange, longitudinally pale-striped, seeds dark brown. Stripes over fruits are retained even at dead-ripe stage.

Fl. & Fr.: July-November

Uniqueness: New distribution record to Arunachal Pradesh and Manipur. Earlier reported from Nagaland.

Source: Pradheep *et al.* (2021)

Trichosanthes majuscula (C.B. Clarke) Kundu

Family	:	Cucurbitaceae
Common name	:	Wild snake gourd
Accession/Identifier No.	:	KP 1156, KP 1157
Locality of collection	:	Napit, East Siang, Kabali, Lower Dibang Valley (Arunachal Pradesh), Bijoy Nagar, Kamrup, Chapori, Dhemaji (Assam), Kokaley, East Sikkim (Sikkim)
Biological status	:	Wild



Remarks: Wild relative of snake gourd. *T. majuscula* is a woody dioecious climber with robust stems; woody, 3-fid tendrils; deeply lobed leaves; oblong-ovate, reddish on ripening fruits, mesocarp thick, pulp greenish black; seeds dark brown, ovate-oblong; common in forest edges in Meghalaya; occasional in Assam and Arunachal Pradesh.

Fl. & Fr.: July-November

Uniqueness: New distribution record to Assam, Arunachal Pradesh and Sikkim, rare in occurrence. Earlier reported from Meghalaya and probably also in Bhutan.

Source: Pradheep *et al.* (2021)

Trichosanthes pilosa Lour.

Family	:	Cucurbitaceae
Common name	:	Wild snake gourd
Vernacular name	:	Wild snake gourd
Accession/Identifier No.	:	HS22158
Locality of collection	:	Sikkim
Biological status	:	Wild



Remarks: Distant relative of snake gourd. It is a perennial dioecious climber with deeply grooved stem; stout, 2-fid tendril; densely pubescent cordate leaf, fruit oblong having rounded base, acute apex; sub-quadrangular seeds. Extended distribution of this species westwards into the Eastern Ghats region, is of phytogeographic significance.

Fl. & Fr.: July-November

Uniqueness: Species reported first time from Sikkim and Andhra Pradesh. Earlier reported from A & N Islands, Arunachal Pradesh, Assam, Meghalaya, Nagaland, Tripura and West Bengal.

Source: Pradheep *et al.* (2017)

Tubocapsicum anomalum (Franch. & Sav.) Makino

Family	:	Solanaceae
Common name	:	Wild Japanese pepper
Vernacular name	:	Jangli makoe
Accession/Identifier No.	:	IC0630421, HS23695(NHCP, NBPGR); ARUN 47143 (BSI, Arunachal Pradesh)
Locality of collection	:	Janbo, Jengging Circle, Upper Siang district (Arunachal Pradesh)
Biological status	:	Wild



Remarks: The species was found with scarlet red berries (grows on road side along forest fringes between 900-1000m). A perennial, glabrous herb. The taste of berry was slightly bitter with little pungency and has aroma like chilli, with capsaicin value being 0.483 µg/g. Its prolific fruit-bearing nature, high seed number per fruit and fruit flavour like chilli.

Fl. & Fr.: August -January

Uniqueness: Reported new to flora of Arunachal Pradesh, deserves thorough study as a potential genetic resource in India.

Source: Rathi *et al.* (2020)

Tupistra clarkei Hook. f.

Family	:	Asparagaceae
Common name	:	Nakima
Vernacular name	:	Nakima, Barma & Parvek (Sikkim), Teeta nekemo (Darjeeling)
Accession/Identifier No.	:	KP19-2831, HS24177
Locality of collection	:	South and West Sikkim districts, Sikkim
Biological status	:	Wild also cultivated



Notes/Remarks: An endemic species of Eastern Himalaya and adjoining Meghalaya. Species occurs between 700 and 2100 m. It is a perennial, clump-forming, acaulescent, evergreen, glabrous herb, rhizomes thick, creeping, fibrous. Inflorescence is cooked as vegetable, preferred over other vegetable due to its nutritional and medicinal value; flowers are taken to control diabetes and used as tonic. Plant is easy to cultivate, higher nutritive and therapeutical values indicate its potential for popularization.

Fl. & Fr.: September-October

Uniqueness: Cultivation reported first time in Sikkim, Kalimpong and Darjeeling (West Bengal) under homestead.

Source: Pradheep *et al.* (2020)

Vigna angularis var. *nipponensis* (Ohwi) Ohwi and H. Ohashi

Family	:	Fabaceae
Common name	:	Wild Vigna
Vernacular name	:	Japanese wild adzuki bean,
Accession/Identifier No.	:	IC622871, HS 22558, HS 22682, BSI (ARUN) 40664
Locality of collection	:	Tuensang district (Nagaland), Aizwal district (Mizoram), Changlang and Tirap districts (Arunachal Pradesh)
Biological status	:	Wild



Remarks: It's a close relative of adzuki bean. The plant has a twining stem; primary leaf cordate with long petiole; terminal leaflet narrowly ovate; inflorescence axillary racemes, flowers bright yellow; pods spreading, narrow, 4-5 cm long. It grows in disturbed habitats such as riverbanks, edges of crop fields, and roadside verges. Young pods are eaten in NEH region.

Fl. & Fr.: September-December

Uniqueness: New distribution and use recorded from Arunachal Pradesh, Mizoram, Nagaland states of North-eastern region.

Source: Bhatt *et al.* (2021)

Ziziphus oenopolia (L.) Mill.

Family	:	Rhamnaceae
Common name	:	Wild jujube
Vernacular name	:	Makoh
Accession/Identifier No.	:	HS23108
Locality of collection	:	Near Army area, Campbell Bay (Great Nicobar)
Biological status	:	Wild



Remarks: Wild relative of Ber. Also found in Little Nicobar, rare in open areas and low-land swampy areas. It is a thorny, straggling or climbing shrub, leaves are ovate-lanceolate, acute and oblique, flowers are green, in subsessile axillary cymes, fruit is a globose drupe, black and shiny when ripe, containing a single seed. It grows along roadside forests and thickets. The berries are edible, while plant parts are used as medicine.

Fl. & Fr.: September-December

Uniqueness: This taxon has new distribution record to Great Nicobar. Earlier reported from tropical and subtropical areas; southern & south-eastern Asia.

Source: Pradheep *et al.* (2020)

POTENTIAL PLANT SPECIES

Besides number of food crops such as wheat, maize and rice human beings are also dependent on other plant species that meet day to day needs. These species play an invaluable role in reducing the world hunger and enhancing the food quality due to being nutritionally very rich (Zeven and de Wet, 1982; Harlan, 1992).

It is estimated that approximately 5,000 potential plants or underutilized plant species are reported globally (Arora and Pandey, 1996; Turner, 2003). Due to lack of awareness, their contributions to sustainable food systems are severely under-valued. The term “potential plant species” have been used in this document to define plant taxa that have been assessed for its hidden value, tested over generation and are being used only at the smaller magnitude. They may be adapted to regional conditions, require fewer economic inputs than many conventional crops. Many such species can thrive well on unsuitable soils thereby more economically viable to rural and marginal farmers (Arora, 2014).

There are enormous number of wild plant species identified at different climatic regions and used by locals (Anonymous, 1995; Jain, 1963, 1981; Arora, 1981). ‘Potential plant species’, known for rich micro-nutrients in their economic parts are grown in kitchen garden, or harvested from forests, both for household consumption and sold in local markets (Maikhuri, 1991). Use of consumption or utilization may be raw or cooking by applying traditional methods. These taxa are generally associated with the indigenous knowledge and such valuable germplasm needs to be conserved with its traditional knowledge.

In past decades the ICAR-NBPGR has made efforts to collect and conserve this valuable wealth of nearly 750 taxa of potential value and trials are being undertaken to popularize selected local/regional food resources.

Among the potential plant taxa, the Crop Wild Relatives (CWRs) can be a valuable source for gene introgression into its crop relatives, which along with the wild useful diversity can be selected as a candidate for neo-domestication. Crop wild relatives are the source of largest reservoir of genetic diversity for crop improvement and have been utilized for disease and pest resistance traits, and abiotic stress tolerance. CWRs are important source of variability for existing crops and can be used more effectively when the genetic base of domestication traits are understood. Of these, CWRs collected for the first time remain a valuable germplasm for ICAR-NBPGR.

Collecting crop wild relatives is one of the priorities of ICAR-NBPGR. Keeping this in view, several explorations are executed after analysing the gaps in collection and surveying the floristic and herbarium records. Since many of these taxa are locally adapted to particular habitats and contain significant genetic diversity, this might create novel crops and help us to achieve more environmentally sustainable agriculture pertinent during climate change regime. Wild okra (*Abelmoschus manibot* subsp. *tetraphyllus*) is being cultivated for its use as clearing agent in small scale

jaggery industry which can be used in breeding of okra. Similarly, wild potential species are CWR as well as wild economic taxa of *Allium* (*Allium przewalskianum*, *A. royeli*, *A. stracheyi*) also grow under cultivation in kitchen garden by people of high altitudes in Himalaya for vegetable and as seasoning spice; flowers of *Crotalaria tetragona*-a close relative of sun hemp under wild and in cultivation in Mizoram areas are used as garnishing purpose.

Similarly other regionally useful species like *Marsdenia macrophylla*, *Sauropus androgynus*, *Rhus mysorensis*, etc. are also used for various purposes. Potential plants species are growing as wild, used by the local people for food and medicinal value 'wild useful taxa'. Some of these also being in the process of domestication are as below:

- *Bidens pilosa* (leaves) used as a source of medicinal tea 'Ladakhi tea' in Ladakh;
- *Dioscorea esculenta* (tubers) is religiously valuable to use in 'Chhatt Puja' by the people of eastern India;
- *Flemingia procumbens* syn *Moghania vestita* (tubers) consumed and cultivated in Meghalaya;
- *Hodgsonia heteroclita* (seed/nut)-a source of high edible oil;
- *Parkia timoriana* (pods)-a high value legume tree is maintained in NEH region as an important source of income;
- *Blumea lacera* is cultivated for a famous local dish 'Umbadiyu' in Valsad district of Gujarat;
- *Arivela viscosa* syn *Cleome viscosa* used as spice in Godavari district of Andhra Pradesh and Garhwal region of Uttarakhand; also cultivated sporadically in Uttarakhand.

In this chapter, 20 selected 'potential plant species' including wild harvested taxa and crop wild relatives (collected for the first time) and explored from difficult areas have been enumerated in detail along with illustration.

Abelmoschus manihot
(L.) Medik. subsp. *tetraphyllus* (Roxb. ex Hornem.) Borss.

Family	:	Malvaceae
Common name	:	Jangli bhendi
Vernacular name	:	Sukhlai
Accession/Identifier No.	:	HS22027
Locality of collection	:	Terai belt and foothills of Uttarakhand and adjoining Uttar Pradesh
Biological status	:	Wild also cultivated



Remarks: It is a wild relative of okra. This taxon is a 1-2 m tall annual or perennial herb with palmately 5-9-lobed leaf, solitary flower, ovoid-ellipsoid, densely hirsute capsule and reniform seed. Farmers have been using it for several decades, but its commercial cultivation has been recorded, probably over decades after increased demand for organic jaggery.

Fl. & Fr.: October - November

Uniqueness: First time reported under commercial cultivation to use as organic clearant in small scale jaggery industry.

Source: Pandey *et al.* (2016)

Aleurites fordii Hemsl.

Family	:	Euphorbiaceae
Common name	:	Tung oil tree, China wood tree
Vernacular name	:	Tung
Accession/Identifier No.	:	IC0278136
Locality of collection	:	Keifang, Champhai (Mizoram)
Biological status	:	Forest tree



Remarks: It is under forestry plantation in Mizoram, Manipur, Nagaland of the NEH region. The plant is a medium tall, monoecious tree; leaves simple, heart shaped with 3 shallow maple like lobes; flowers pale pink to purple with dark red streaks; fruit woody, spherical to pear shaped. Seed is a source of alpha-eleostearic acid and methioninine content. Tung oil makes a widely used drying ingredient in paints, varnishes, coatings and finishes; also has the potential to be used as an alternate of diesel.

Fl. & Fr.: February - November

Uniqueness: An oil yielding potential/underutilized tree with high industrial value. IC0278136 identified with high (81.02%) content of α -eleostearic acid.

Source: Rathi *et al.* (2012)

Allium prezwalskianum Regel

Family	:	Amaryllidaceae
Common name	:	Chives
Vernacular name	:	Jangli pyaz
Accession/Identifier No.	:	IC632210, HS24338
Locality of collection	:	Niti Valley, Chamoli, Uttarakhand
Biological status	:	Wild, also cultivated



Remarks: This species was introduced from Tibet a century before in Uttarakhand Himalaya; is now under commercial cultivation in Niti valley. It is a 10-35 cm high herb with clustered bulbs, narrowly ovoid-cylindric leaves, hemispheric to globose, densely many flowered umbel and pale red to dark purple perianth. Distributed in western Himalayas and found in scrub, dry slopes, rock crevices between 2000-4800 m. Largely used as seasoning spice in Uttarakhand and Ladakh.

Fl. & Fr.: June-October

Uniqueness: This forms the first reports on the cultivation of the species in India.

Source: Pandey *et al.* (2021)

Allium roylei Stearn

Family	:	Amaryllidaceae
Common name	:	Wild <i>Allium</i>
Vernacular name	:	Bazun (Kashmir)
Accession/Identifier No.	:	KMR-MK-21, HS24337, HS20313
Locality of collection	:	FGB, NBPGR Regional Station, Bhowali (Uttarakhand)
Biological status	:	Wild also cultivated



Remarks: This species is a potential wild relative, cross compatible with onion and source of disease resistance trait. It is a 20-40 cm tall herb, not sheathed on the root stock, bulb ovoid; leaves linear, grooved; umbel hemispherical, 15-40 flowered, tepals oval lanceolate, reddish. Grows on moist rocky slopes (2000-3200 m), also grown as seasoning spices. Distributed in western Himalaya (Kashmir).

Fl. & Fr.: July-October

Uniqueness: First report of cultivation in kitchen gardens in Kashmir (J&K).

Source: Pandey *et al.* (2021)

Allium stracheyi Baker

Family	:	Amaryllidaceae
Common name	:	Wild <i>Allium</i>
Vernacular name	:	Jambu, Pharan (Uttarakhand)
Accession/Identifier No.	:	KMR-65, HS24887, HS24879
Locality of collection	:	Niti Valley, Chamoli, Uttarakhand
Biological status	:	Wild also cultivated



Remarks: Wild relative of onion and garlic. A perennial herb with clustered bulbs having red membranous scale; narrow linear, flattened leaves; globose to sub-globose, dense flowered umbels; light yellow or pink flower. Grows in dry open slopes or rocky soil near water streams (2000-3800 m), also cultivated for seasoning spice and curry powder. Distributed in Western Himalayas from Kashmir-Kumaon.

Fl. & Fr.: July-October

Uniqueness: The species has been included in Red Data Book of Indian Plants as critically endangered species due to its indiscriminate harvest for commercial use.

Source: Pandey *et al.* (2021)

Arivela viscosa (L.) Raf. Syn *Cleome viscosa* L.

Family	:	Cleomaceae
Common name	:	Sticky cleome, Asian spider weed, Hul-hul
Vernacular name	:	Kukkavaminta (Andhra Pradesh), Jakhya (Uttarakhand)
Accession/Identifier No.	:	HS25386, SS3182, SS3183
Locality of collection	:	Jeelugumili village, West Godavari district (Andhra Pradesh)
Biological status	:	Wild also cultivated



Remarks: A less known seasoning spice of people of West Godavari district (Andhra Pradesh) and Garhwal region (Uttarakhand), where it is also under sporadic cultivation. *A. viscosa* is an annual sticky herb with branched stem, 3-5 foliate leaves, yellow flowers, compressed linear oblong and hairy fruits and sub-globose, brownish black seeds. Its tiny seeds develop a typical flavour on crackling and have crunchy taste. In Andhra Pradesh, the plants are harvested from wild. In Uttarakhand seeds are sold in village haats/markets.

Fl. & Fr.: July-October

Uniqueness: First time information was recorded on its commercial production and use as seasoning in India.

Source: Pamarhi *et al.* (2022)

Bidens pilosa L.

Family	:	Asteraceae
Common name	:	Spanish needle, Hairy Beggar ticks
Vernacular name	:	Kumra, Kumur
Accession/Identifier No.	:	IC470047, HS16510, HS18470, SS2656
Locality of collection	:	Diskit village, Nubra valley, Leh (J&K)
Biological status	:	Wild also cultivated



Remarks: The plant is a source of local tea ‘Saja’ or ‘Soljaa’ in Ladakh. It is an erect or decumbent annual herb with trifoliate, obovate-lanceolate, crenate leaf, solitary or paired yellow capitula, achene linear, black ending with awns. This naturalized weed is distributed in moist, shady and disturbed habitats has also been reported to occur in higher reaches of north-western Himalaya. It has been used in preparation of a medicated herbal health beverage for high altitude regions.

Fl. & Fr.: April-October

Uniqueness: First time reported as cultigen of kitchen garden in Ladakh region.

Source: Bhatt *et al.* (2009)

Blumea lacera (Burm.f.) DC.

Family	:	Asteraceae
Common name	:	Lettuce-leaf Blumea
Vernacular name	:	Kalhar, Kolhar, Pilo Kapuria
Accession/Identifier No.	:	HS25416
Locality of collection	:	Dungri, Valsad district, Gujarat
Biological status	:	Wild



Remarks: The local recipe “Umbadiyu” prepared from this plant is sold in various roadside eatery shops (dhabas) in Gujarat. *B. lacera* is an annual tall branched herb, oblanceolate to obovate leaves, flowers yellow, borne on axillary cymes. The plant grows naturally throughout the Indian plains, north-west in the Himalaya onwards to the southernmost parts at 100-800 m asl in fallow land, grasslands and roadsides wastelands.

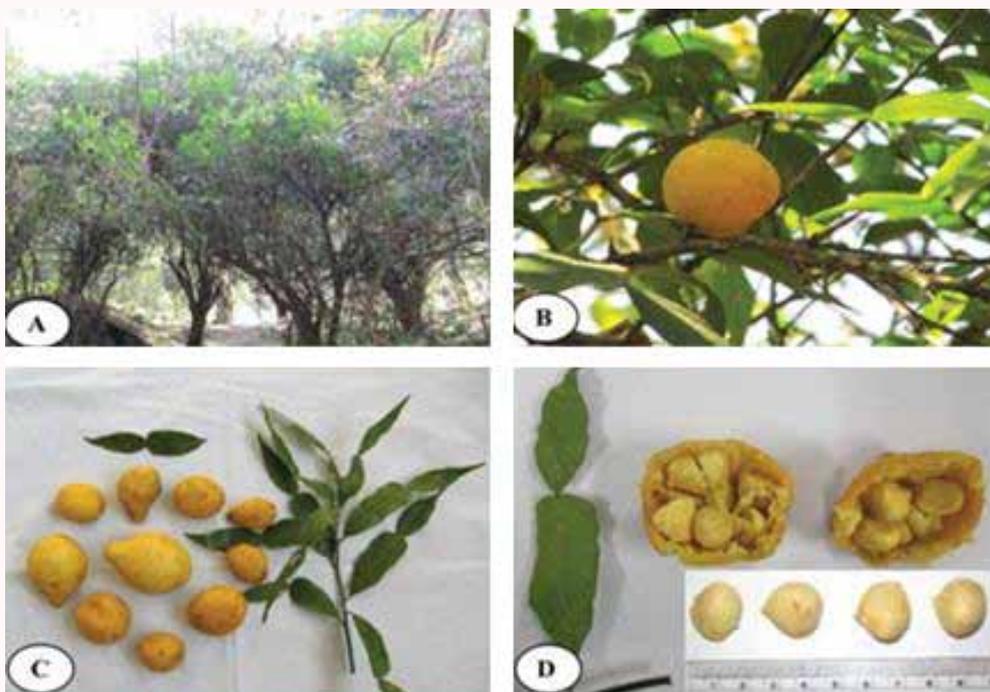
Fl. & Fr.: September-November

Uniqueness: Use of leaves on a local tribal cuisine called “Umbadiyu” was recorded first time from Gujarat.

Source: Pandey *et al.* (2022)

Citrus ichangensis Swingle

Family	:	Rutaceae
Common name	:	Ichang Papeda, Wild citrus
Vernacular name	:	Ketsa Chupfu
Accession/Identifier No.	:	IC594160, IC594161
Locality of collection	:	Near Khonoma village, Kohima (Nagaland)
Biological status	:	Wild



Remarks: A wild species of genus *Citrus*, very hardy and can be used in breeding for cold tolerant trait. It is a large shrub or small tree and produce small mandarin like oval, spherical or flattened fruits with rugged rind. The population has been reported to grow in the forest in natural wild state. Fruits are not edible due to the large number of big sized mono-embryonic seeds and scanty pulp with bitter and sour juice.

Fl. & Fr.: March-July

Uniqueness: A rare species of citrus reported from north-eastern hill region.

Source: Malik *et al.* (2012)

Crotalaria tetragona Roxb. ex Andr.

Family	:	Fabaceae
Common name	:	Eastern rattlepod, Wild sun hemp
Vernacular name	:	Tum-thang
Accession/Identifier No.	:	HS19875
Locality of collection	:	Keifang village in Aizwal district and Kolasib town in Kolasib district
Biological status	:	Wild also cultivated



Remarks: A close relative of sun hemp. It is an erect-ascending perennial herb with velvet silky 4-angled branches, handsome, lemon yellow flowers, long stalked, oblong-lanceolate leaves, 10-20 seeded oblong pod. Distributed in Kumaon to NEH region. Flowers and flower buds are sold in the market, used as vegetable and also boiled with non-vegetarian food items to increase the flavour in NEH region. Its wide uses for edible purposes in the north-eastern hill region is suggests a trend towards domestication.

Fl. & Fr.: August-October

Uniqueness: Recorded first time under cultivation in kitchen garden in NEH region.

Source: Bhatt *et al.* (2009)

Cucumis callosus (Rottb.) Cogn.

Family:	:	Cucurbitaceae
Common name:	:	Bitter cucumber,
Vernacular name:	:	Indravan, Kachri
Accession/Identifier No.:	:	HS21611
Locality of collection:	:	Dabrounh and Herradand villages, Umaria district, Madhya Pradesh
Biological status:	:	Wild



Remarks: ‘Indravan’, a wild progenitor of melon and has attracted the attention of breeders, as this species is source of genes for resistance to fruit fly and cater pillars. It is extensively used in Indian system of medicines (ISM) to cure several diseases. *C. callosus* is a perennial climber with angular stem, hispid, suborbicular, 5-7 lobed palmate leaves, and obovoid fruits. It occurs in field bunds, grasslands, farm boundaries in whole of Deccan Plateau and Indo-Gangetic plain. The plants are uprooted by Baiga and Gond tribes in Umaria district of MP for medicinal use.

Fl. & Fr.: May-August

Uniqueness: Threatened in parts of Madhya Pradesh due to indiscriminate use for medicine.

Source: Panwar *et al.* (2014)

Dioscorea esculenta (Lour.) Burkill

Family	:	Dioscoreaceae
Common name	:	Lesser yam
Vernacular name	:	Suthni-aalu
Accession/Identifier No.	:	KCB-17/12
Locality of collection	:	Chinabasti, Hailakandi, Assam
Biological status	:	Cultivated also wild



Remarks: It is a less known potential root crop. It is an evergreen perennial, prickly climber with a tuberous rootstock and soft, heart shaped leaves. Each stolon bears about 5 -20 light yellow tubers, which are smaller than other cultivated *Dioscorea* species. It also occurs in wild mostly in northern India, has more spines as compared to cultivated one. Boiled, roasted and fried tubers are eaten. Boiled tubers are also distributed as prasad on the occasion of ‘Chhat Puja’ and ‘Ekadashi’ in the month of November. Plants are uprooted at dormant stage for tuber in month of November.

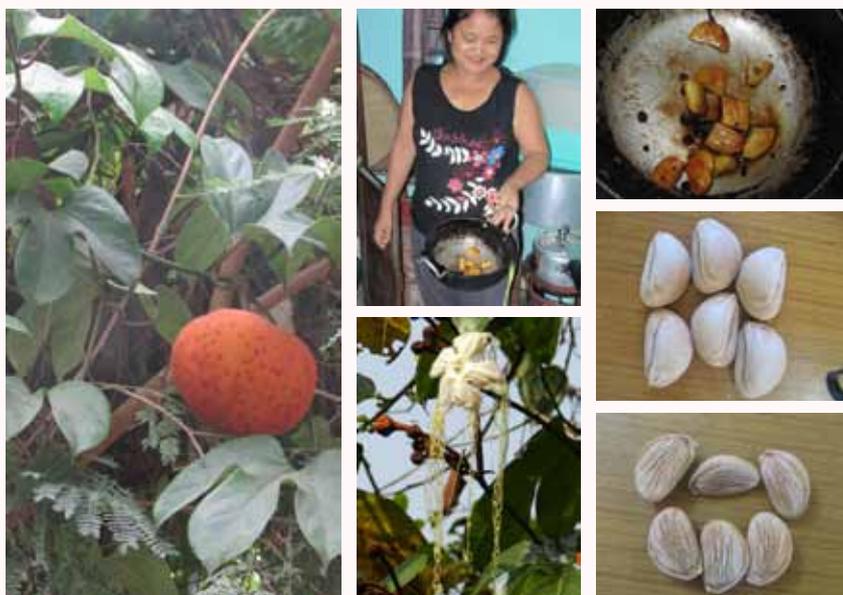
Fl.& Fr.: July-November

Uniqueness: Less-known cultivated species grown for use in religious ceremony in Eastern India.

Source: Bhatt *et al.* (2019)

Hodgsonia heteroclita (Roxb.) Hook. f. & Thoms.

Family	:	Cucurbitaceae
Common name	:	Chinese Lard fruit, Kadam seed
Vernacular name	:	Kathai (Manipur), Tithai (Nagaland), Kha-um (Mizoram)
Accession/Identifier No.	:	HS20671 and SS2935
Locality of collection	:	Senapati district of Manipur
Biological status	:	Wild also cultivated



Remarks: Its nut is supposed to be a rich source of edible oil and protein was conserved first time as germplasm. It grows in wild habitats as well as under domestication in homesteads in NEH region. *H. heteroclita* is a large, semi-woody, dioecious perennial climber with coriaceous, 3-5 lobed leaves, fimbriate flowers, pomiform, grooved, compressed globose fruits, flattish, ellipsoid seeds. Its endosperm is traditionally used as energetic food and medicine by tribals of NEH region of India, may be considered as a prospective species for cultivation.

Fl. & Fr.: March-December

Uniqueness: A high (62-71 %) edible oil yielding potential nut from NEH region, also recorded under cultivation in kitchen garden.

Source: Semwal *et al.* (2014)

Houttuynia cordata Thunb.

Family	:	Saururaceae
Common name	:	Fish mint
Vernacular name	:	Ja-myrda (Meghalaya); Siiya hamang (Arunachal Pradesh)
Accession/Identifier No.	:	IC0538830, IC0538847
Locality of collection	:	Zero and Supuye forest, Lower Subansiri, Arunachal Pradesh
Biological status	:	Wild also cultivated



Remarks: It is used as vegetable, condiment & medicine in NEH region and sold in market. The plant is native to mountainous region of eastern Asia and occurring up to 2500m in moist localities. *H. cordata* is a herb and has creeping root with spreading runners; stems green or sometimes purplish red; leaves heart-shaped purple underneath; flowers small, with 4 white petal like bracts at the base. The herb gives a very unpleasant smell when bruises its leaf. Because of over exploitation, the population is under threat in the natural habitats of North-east India.

Flowering: May-June

Uniqueness: A potential wild species reported under cultivation in NEH region for vegetable.

Source: Rathi *et al.* (2013)

Marsdenia macrophylla (Humb. & Bonpl. ex Schult.) E. Fourn.

Family	:	Apocynaceae
Common name	:	Kachri, Wild melon
Vernacular name	:	An-kha-pui (Mizo, Hmar)
Accession/Identifier No.	:	RSR/NSP 18-75
Locality of collection	:	Churachandpur, Manipur
Biological status	:	Wild also cultivated



Remarks: A climbing shrub, up to 5m high, leaves opposite, dark green, flowers in paniculate cyme, purple. It is rarely distributed in NE Region, grows wild and cultivated by Mizo tribes. This plant occurs naturally in primary and secondary forests at low and medium altitudes, climbing on trees or sometimes over rocks, also in thickets and on open ground, possibly as remnants of former cultivation. It can be grown successfully in heavy rainfall areas.

Fl. & Fr.: March-June

Uniqueness: Reported under cultivation in Mizoram and parts of Manipur for vegetable.

Source: Annual Report, ICAR-NBPGR (2018)

Nothoscordum gracile (Aiton) Stearn

Family	:	Amaryllidaceae
Common name	:	Fragrant false garlic
Vernacular name	:	Jangli lahasun
Accession/Identifier No.	:	HS21669
Locality of collection	:	FGB, NBPGR Regional Station, Bhowali (Uttarakhand)
Biological status	:	Wild/weedy also cultivated



Remarks: An ornamental species and widely naturalized in many parts of the world; also reported for edible purpose. It resembles to genus *Allium* but it lacks any onion or garlic odour when crushed. It has ovoid bulbs, bulblet over 50; leaf basal, 4-10, linear, flat, umbel 10-15-flowered, flowers fragrant, bell-shaped, with greenish bases and reddish to brown mid veins on outer side of perianth. Confused often with *A. tuberosum* or *A. neapolitanum*. Occurs in barren land, waste places and the abandoned areas.

Fl. & Fr.: March-June

Uniqueness: Recorded as green vegetable in kitchen garden in Uttarakhand.

Source: Pandey *et al.* (2015)

Parkia timoriana (DC.) Merr.

Family	:	Fabaceae
Common name	:	Tree bean
Vernacular name	:	Naga sem/Unkamn-pinching (Nagaland), Zongto (Mizo)
Accession/Identifier No.	:	IC041031, IC0308668; HS22985
Locality of collection	:	Senapati (Manipur); Hailakandi (Assam)
Biological status	:	Wild also planted



Remarks: It grows in the North Eastern region of India, has significant economic values as vegetable, medicine, Industrial and fire wood in this region. *P. timoriana* is up to 20-25m tall tree; leaf bipinnate, divided into 20 to 30 or more leaflets; inflorescence is a head of flowers dangling at the end of a peduncle long up to 45cm; pod up to 36 cm long and seeds hard. Its pods are nutritive vegetable; tender and mature pods used raw as salad (Singju) and cooked with fish and meats in entire NEH region. This tree is suitable for reclamation of abandoned Jhum lands and also as agro-forestry plantations.

Fl. & Fr.: September-May

Uniqueness: A potential multi-purpose tree species of NEH region.

Source: Rathi *et al.* (2012)

Perilla frutescens (L.) Britton var. *frutescens*

Family	:	Lamiaceae
Common name	:	Wild perilla
Vernacular name	:	Jangli bhangjira
Accession/Identifier No.	:	IC552393, IC552394, IC552395
Locality of collection	:	Foothills in Pauri and Champawat districts, Uttarakhand
Biological status	:	Wild/weedy



Remarks: It grows on roadside, abandoned fields, river basin, can be used in breeding of cultivated *Perilla*. Its plants are erect, branching from top, stem quadrangular, deeply ridged and grooved, inflorescence axillary and terminal, seeds round, reticulate markings on the seed coat. Its seeds have been reported to be utilized as an oilseed and seemed to be escapee from non-edible cultivated types.

Fl. & Fr.: April-November

Uniqueness: It is a weedy form of cultivated *Perilla*, confined to the foothills of Himalaya, collected and conserved first time.

Source: Pandey and Bhatt (2008)

Rhus mysorensis L.

Family	:	Anacardiaceae
Common name	:	Mysore Sumac
Vernacular name	:	Dansri
Accession/Identifier No.	:	IC636605, HS24577
Locality of collection	:	Thanagaji village, Alwar (Rajasthan)
Biological status	:	Wild



Remarks: This plant is reported as medicinal. The tribal people in Alwar district of Rajasthan, consume seeds as snacks during autumn (October). Mysore Sumac is a small aromatic, often gregarious shrub with a thin brown bark and spiny branches; leaves are divided into 3 leaflets, deeply toothed, or lobed, flowers are small, white, or greenish, borne in panicles at the end of branches or in leaf axils, fruit is a small, dry, compressed drupe. The plant is known to possess various active constituents like steroids, alkaloids, flavonoids, glycosides, tannins and Phenols.

Fl. & Fr.: February-August

Uniqueness: The edible value of this medicinal plant reported first time.

Source: Annual Report, ICAR-NBPGR (2020)

Sauropus androgynus (L) Merr.

Family	:	Euphorbiaceae
Common name	:	Star gooseberry, Sweet leaf
Vernacular name	:	Badi Sundari (Assam), Ghom Oying (Arunachal), Madhura cheera
Accession/Identifier No.	:	IC0633729
Locality of Collection	:	Logum Jimi, Aalo, West Siang, Arunachal Pradesh
Biological Status	:	Wild also planted in house boundaries



Remarks: It is one of the most popular leafy vegetables in South and Southeast Asia. Its called multivitamin plant due to presence of high vitamins and nutrients. A shrub with cylindrical or angled branches, leaves are pinnately compound, flowers dark red, fruits globular, light yellow. Leaves are cooked as vegetable and also consumed raw or cooked in soups. Leaves are used as anti-diabetic and largely used in weight loss. Its plant looks beautiful hence planted on boundaries of house. Its matured leaves are good source of α and β -carotenes, proteins and minerals.

Fl. & Fr.: April-August

Uniqueness: A potential source of multi-vitamins and has ornamental value.

Source: Rathi *et al.* (2021)

OVERVIEW

Indian region holds one of the twelve mega-biodiversity centres with estimated plant diversity of 54,733 taxa includes (angiosperms, gymnosperms, pteridophytes, bryophytes, lichens, fungi, algae and microbes) including 40 % of the angiosperms (BSI, 2020). The scope of searching for valuable germplasm/ species of PGR relevance has remained under the umbrella of agri-biodiversity where in higher plants nearly 500 species of cultivated plants play a vital role towards variously useful plants.

With the ICAR-NBPGR mandated crops, vascular plants are the dominating component of the genetic resources, the collection of many such notable germplasm is important for “current and future use”. The ICAR-National Bureau of Plant Genetic Resources (ICAR-NBPGR) rigorously puts the efforts to access the difficult accessibility areas, diversity rich pockets in the country to explore and collect valuable material. The bureau lays priority for collection, validation and simultaneously through evaluation to enhance the scope for utilization.

Wide variation in the topography contained in diverse habits are the ideal sites for screening of the germplasm under natural habits. Man-made selection in tribal and ethnic diversification and plant usages for human use and religious rituals has resulted in bringing the germplasm a status of uniqueness.

The document on **“75 Unique Plant Germplasm Collections by the ICAR-NBPGR”** has put selected glimpses of the output made by NBPGR in past four decades. It contains seven chapters; chapter 1 provides an introduction to the total exploration background with process of collecting in brief and the status of diversity; chapters 2, 3, 4 and 5 detail out the trait specific germplasm, new records and new species identified, extended distribution of taxa and potential species respectively along with photographs and illustrations, chapter 6 about overview and chapter 7 covers references. Each of the 2-5 chapters covers the taxa as description sheet with important images.

Chapter 2, 3, 4 and 5 are dealing with the trait specific germplasm, new records and new species identified, extended distribution of taxa and potential species respectively. Notable contributions in these categories may be overlapping but for readers clarity they have been dealt separately.

Significant germplasm of cultivated and wild material has been assembled from all over the country, but still there are gaps in wild/less-cultivated taxa; areas have been unattended in agro-ecological zones. Moreover, many taxa which have been reported from new areas; could not be conserved, needs to be collected for the purpose. Moreover, further research/study on different aspects of PGR can also be conducted on such potential /unique germplasm. Thus, this document would facilitate in identification of areas of availability and identification tips to fill the gaps in unique collections.

New taxa and new usages, new notable findings are likely to be recorded in future. The following thrusts include are:

- ◆ Enrichment of the germplasm with desirable traits as per collection of prioritized and unattended taxa.
- ◆ Conducting specific exploration missions in diversity rich sites for prioritized taxa.
- ◆ Validation of traits specific germplasm through various tools.
- ◆ Extension of less-known cultivated taxa with help of networking with other institutes.
- ◆ Potential material: identification and authentication of reported use.
- ◆ Establishing network with organization working on similar programmes on genetic resources.

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LIST OF TAXA/SPECIES

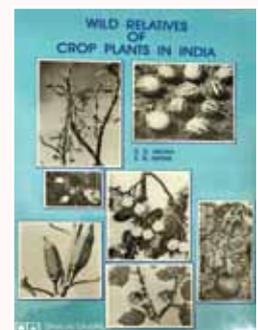
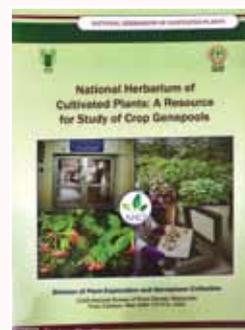
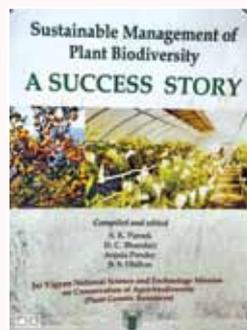
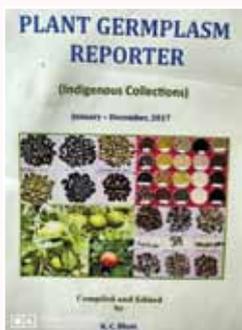
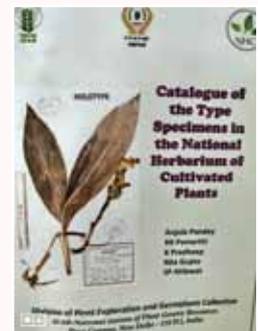
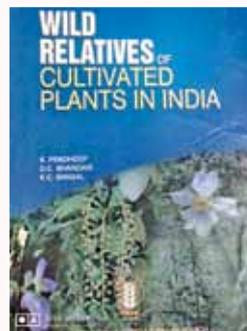
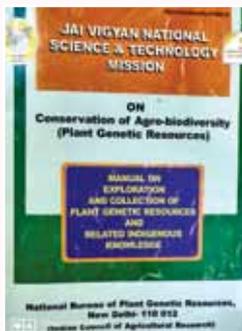
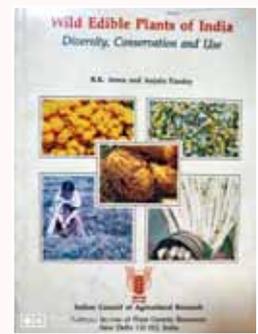
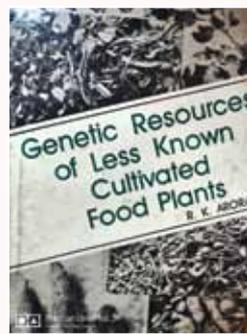
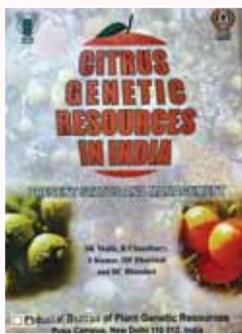
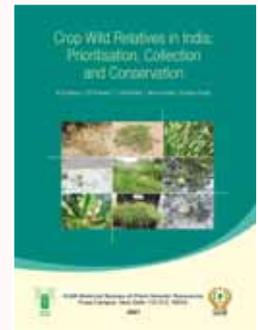
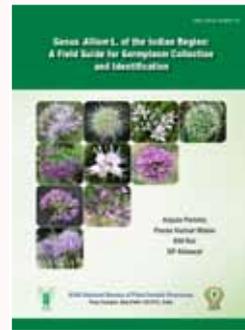
Annexure 1

S. No.	Taxa/Species	Family	Page No.
1	<i>Abelmoschus angulosus</i> var. <i>mahendragiriensis</i> RC Misra and DR Pani	Malvaceae	22
2	<i>Abelmoschus enbeepeegearense</i> KJ John, Scariah, Nissar, KV Bhat and SR Yadav	Malvaceae	23
3	<i>Abelmoschus manihot</i> (L.) Medik. subsp. <i>tetraphyllus</i> (Roxb. Ex Hornem.) Borss.	Malvaceae	69
4	<i>Abelmoschus moschatus</i> Medik.	Malvaceae	43
5	<i>Abelmoschus pungens</i> var. <i>mizoramensis</i> KJ John, Krishnaraj and K Pradheep	Malvaceae	24
6	<i>Abelmoschus tuberculatus</i> Pal and Singh	Malvaceae	25
7	<i>Aegilopes tauschii</i> Coss.	Poaceae	6
8	<i>Aleurites fordii</i> Hemsl.	Euphorbiaceae	70
9	<i>Allium fasciculatum</i> Rendle	Amaryllidaceae	44
10	<i>Allium negianum</i> A Pandey, KM Rai, PK Malav and S Rajkumar	Amaryllidaceae	21
11	<i>Allium przewalskianum</i> Regel	Amaryllidaceae	71
12	<i>Allium roylei</i> Stearn.	Amaryllidaceae	72
13	<i>Allium stracheyi</i> Baker	Amaryllidaceae	73
14	<i>Allium tuberosum</i> Rottler ex Sprengel	Amaryllidaceae	45
15	<i>Amaranthus hybridus</i> L.	Amaranthaceae	46
16	<i>Arivela viscosa</i> (L.) Raf.	Cleomaceae	74
17	<i>Bacopa monnieri</i> (L.) Pennell	Scrophulariaceae	47
18	<i>Bidens pilosa</i> L.	Asteraceae	75
19	<i>Blumea lacera</i> (Burm.f.) DC.	Asteraceae	76
20	<i>Brassica tourneforti</i> Gouan.	Brassicaceae	7
21	<i>Caryota obtusa</i> Griff.	Arecaceae	48
22	<i>Citrus ichangensis</i> Swingle	Rutaceae	77
23	<i>Corchorus aestuans</i> L.	Tiliaceae	49
24	<i>Corchorus pseudo-olitorius</i> Islam and Zaid	Tiliaceae	26
25	<i>Coriandrum sativum</i> L.	Apiaceae	9
26	<i>Crotalaria tetragona</i> Roxb. ex Andr.	Fabaceae	78

S. No.	Taxa/Species	Family	Page No.
27	<i>Cucumis callosus</i> (Rottler) Cogn.	Cucurbitaceae	79
28	<i>Cucumis melo</i> L. var. <i>ahwarensis</i> A. Pandey and S. Raj Kumar	Cucurbitaceae	10
29	<i>Cucumis sativus</i> L.	Cucurbitaceae	8
30	<i>Curcuma amada</i> Roxb. var. <i>glabra</i>	Zingiberaceae	27
31	<i>Curcuma karnatakensis</i> Amalraj, Velay. and Mural.	Zingiberaceae	28
32	<i>Curcuma kshonapatra</i> Vel.	Zingiberaceae	29
33	<i>Curcuma kudagensis</i> Velay., VS Pillai and Amalraj	Zingiberaceae	30
34	<i>Curcuma longa</i> var. <i>vanaharidra</i> Velay, SR Pandravada, JK George and KS Varaprasad	Zingiberaceae	31
35	<i>Curcuma malabarica</i> Velay., Amalraj & Mural	Zingiberaceae	32
36	<i>Curcuma thalakaveriensis</i> Velay., Amalraj & Mural.	Zingiberaceae	33
37	<i>Dioscorea esculenta</i> (Lour.) Burkill	Dioscoriaceae	80
38	<i>Dioscorea piscatorum</i> Prain & Burkill	Dioscoriaceae	50
39	<i>Fagopyrum gracilipes</i> (Hemsl.) Dammer ex Diels	Polygonaceae	51
40	<i>Flemingia procumbens</i> Roxb.	Fabaceae	12
41	<i>Herpetospermum operculatum</i> K Pradheep, A Pandey, KC Bhatt and ER Nayar	Cucurbitaceae	34
42	<i>Hodgsonia heteroclita</i> (Roxb.) Hook. f. & Thoms.	Cucurbitaceae	81
43	<i>Houttuynia cordata</i> Thunb.	Saururaceae	82
44	<i>Juglans sigillata</i> Dode	Juglandaceae	52
45	<i>Lens culinaris</i> Medik.	Fabaceae	13
46	<i>Marsdenia macrophylla</i> (Humb. & Bonpl. ex Schult.) E. Fourn.	Apocynaceae	83
47	<i>Momordica cochinchinensis</i> subsp. <i>andamanica</i> KJ John, YC Roy and Krishnaraj	Cucurbitaceae	35
48	<i>Momordica sahyadrica</i> subsp. <i>anomalayana</i> KJ John, K Pradheep et Krishnaraj	Cucurbitaceae	36
49	<i>Momordica subangulata</i> Blume subsp. <i>subangulata</i>	Cucurbitaceae	53
50	<i>Nothoscordum gracile</i> (Aiton) Stearn	Amaryllidaceae	84
51	<i>Oryza sativa</i> L.	Poaceae	14-17
52	<i>Parkia roxburghii</i> G. Don	Fabaceae	85
53	<i>Perilla frutescens</i> var. <i>frutescens</i> (L.) Britton	Lamiaceae	86
54	<i>Piper pseudonigrum</i> (Vel.) Ex E.S.S. Kumar and S.P. Mathew	Piperaceae	37
55	<i>Pluckenetia corniculata</i> Sm.	Euphorbiaceae	54

S. No.	Taxa/Species	Family	Page No.
56	<i>Rhus mysorensis</i> L.	Anacardiaceae	87
57	<i>Sauropus androgynus</i> (L) Merr.	Euphorbiaceae	88
58	<i>Solanum diphyllum</i> L.	Solanaceae	55
59	<i>Solanum virginianum</i> L.	Solanaceae	56
60	<i>Stahlianthus involucratus</i> (King ex Baker) Craib ex Loes.	Zingiberaceae	57
61	<i>Trichosanthes animalaiensis</i> Bedd.	Cucurbitaceae	58
62	<i>Trichosanthes dicaelosperma</i> CB Clarke	Cucurbitaceae	59
63	<i>Trichosanthes dunniana</i> subsp. <i>clarkei</i> K. Pradheep, subsp. <i>nov.</i>	Cucurbitaceae	38
64	<i>Trichosanthes kerii</i> Craib	Cucurbitaceae	60
65	<i>Trichosanthes majuscula</i> (CB Clarke) Kundu	Cucurbitaceae	61
66	<i>Trichosanthes pilosa</i> Lour.	Cucurbitaceae	62
67	<i>Tubocapsicum anomalum</i> (Franch. & Sav.) Makino	Solanaceae	63
68	<i>Tupistra clarkei</i> Hook.f.	Asparagaceae	64
69	<i>Vigna angularis</i> var. <i>nipponensis</i> (Ohwi) Ohwi and H. Ohashi	Fabaceae	65
70	<i>Vigna konkanensis</i> Latha, KV Bhat, IS Bisht, Scariah, KJ John and Krishnaraj	Fabaceae	39-40
71	Wild triticeae (<i>Elymus</i> spp., <i>Leymus</i> spp., <i>Hordeum</i> spp.)	Poaceae	11
72	<i>Zea mays</i> L.	Poaceae	17
73	<i>Ziziphus oenopolia</i> (L.) Mill	Rhamnaceae	66

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