

# 75 UNIQUE INTRODUCTIONS IN PLANT GENETIC RESOURCES





# 75 UNIQUE INTRODUCTIONS IN PLANT GENETIC RESOURCES



**ICAR-National Bureau of Plant Genetic Resources**  
Pusa Campus, New Delhi 110012, India  
[www.nbpgr.ernet.in](http://www.nbpgr.ernet.in)



***Citation:***

Vandana Tyagi, Pratibha Brahmi, S K Yadav, Pragya, Puran Chandra and Ashok Kumar (2022), 75 unique introductions in plant genetic resources, ICAR-National Bureau of Plant Genetic Resources. 78p.

***Compiled and Edited by:***

Vandana Tyagi, Pratibha Brahmi, S K Yadav, Pragya, Puran Chandra and Ashok Kumar  
ICAR-National Bureau of Plant Genetic Resources (ICAR-NBPGR), New Delhi-110012

***Technical Assistance:***

SP Singh, Surender Singh & PC Binda

***Published by:***

The Director, ICAR-NBPGR, New Delhi 110012

© 2022

ICAR-National Bureau of Plant Genetic Resources  
Pusa Campus, New Delhi 110012, India

**ISBN : 978-81-957700-0-7**

***Disclaimer:***

This document is only a compilation of available information/records and the authors are not responsible for any discrepancies in the published document.

---

Lasertypeset & printed by: M/s. Royal Offset Printers, A-89/1, Naraina Industrial Area, Phase-I, New Delhi-110028

# CONTENTS

S. No.		Page No.
	<b>Message</b>	<b>vii</b>
	<b>Preface</b>	<b>ix</b>
	<b>Indroduction</b>	<b>xi</b>
	<b>List of 75 introductions</b>	<b>1-75</b>
1	Kiwi fruit ( <i>Actinidia chinensis</i> Planch.)	1
2	Dragon fruit ( <i>Hylocereus undatus</i> (Haw.) Britton & Rose)	2
3	Kinnow Mandarin ( <i>Citrus nobilis</i> X <i>Citrus deliciosa</i> )	3
4	Monk Fruit ( <i>Siraitia grosvenorii</i> (Swingle) C.Jeffrey ex A.M. Lu & Zhi Y. Zhang)	4
5	Avocado ( <i>Persea americana</i> Mill.)	5
6	Bush Mango ( <i>Iringia gabonensis</i> (Aubry-Lecomte ex o' Rorke) Baill.)	6
7	Pecan nut ( <i>Carya illinoensis</i> (Wangenh.) K. Koch.)	7
8	Pineapple guava ( <i>Feijoa sellowiana</i> Berg.)	8
9	Husk tomato (Tomatillo) ( <i>Physalis ixocarpa</i> Brot. ex. Hornem.)	9
10	Leek var Copenhagen Market Emperial ( <i>Allium ampeloprasum</i> Thunb.)	10
11	Pili nut ( <i>Canarium ovatum</i> Engl.)	11
12	Sunflower ( <i>Helianthus annuus</i> L.)	12
13	Oil palm ( <i>Elaeis guineensis</i> Jacq.)	13
14	Paradise-tree ( <i>Simarouba glauca</i> DC)	14
15	Jojoba ( <i>Simmondsia chinensis</i> C. K. Schreid.)	15
16	Quinoa ( <i>Chenopodium quinoa</i> Willd.)	16
17	Bambara groundnut ( <i>Vigna subterranea</i> (L.) Verdc.)	17
18	Marama bean ( <i>Tylosema esculentum</i> (Burch.)A. Schreib.)	18
19	Peruvian Lily/ Lily of the Incas ( <i>Alstroemeria aurea</i> Graham)	19
20	Asafoetida or Heeng ( <i>Ferula assa-foetida</i> L.)	20
21	Prickly pear/Edible cactus ( <i>Opuntia ficus indica</i> (L.) Mill.)	21
22	Prince-of-Wales feather or prince's-feather ( <i>Amaranthus hypochondriacus</i> L.)	22
23	Hops ( <i>Humulus lupulus</i> L.)	23
24	Apple variety Mantet ( <i>Malus domestica</i> Borkh. )	24
25	Apple variety Fuji ( <i>Malus domestica</i> Borkh.)	25

S. No.		Page No.
26	Apple variety Scarlet Spur ( <i>Malus domestica</i> Borkh.)	26
27	Grape variety Flame Seedless ( <i>Vitis vinifera</i> L.)	27
28	Grape variety Thompson Seedless ( <i>Vitis vinifera</i> L.)	28
29	Grape variety Perlett ( <i>Vitis vinifera</i> L.)	29
30	Grape variety Beauty Seedless ( <i>Vitis vinifera</i> L.)	30
31	Nectarine variety Snow Queen ( <i>Prunus persica</i> (L.) Batsch.)	31
32	Nectarine variety Sunred ( <i>Prunus persica</i> (L.) Batch	32
33	Persimmon variety Fuyu/Fuya ( <i>Diospyros kaki</i> L. f.)	33
34	Plum variety Santa Rosa ( <i>Prunus domestica</i> Thunb.)	34
35	Blackberry variety Black satin Blackberry ( <i>Rubus fruticosus</i> Marshall)	35
36	Banana variety Grand Naine ( <i>Musa acuminata</i> Colla)	36
37	Papaya variety Red Lady ( <i>Carica papaya</i> L.)	37
38	Strawberry variety Torrey ( <i>Fragaria x ananassa</i> )	38
39	Tomato variety Sioux ( <i>Solanum lycopersicum</i> L.)	39
40	Spinach variety Virginia savoy ( <i>Spinacia oleracea</i> L.)	40
41	Onion variety Early Grano ( <i>Allium cepa</i> L.)	41
42	Chilli variety Callifornia Wonder ( <i>Capsicum annum</i> L.)	42
43	Chilli variety Yolo Wonder ( <i>Capsicum annum</i> L.)	43
44	Carrot variety Nantes ( <i>Daucus carota</i> L.)	44
45	Carrot variety Scarlet Nantes Coreless ( <i>Daucus carota</i> L.)	45
46	Radish variety White Icicle ( <i>Raphanus sativus</i> L.)	46
47	Radish variety Scarlet Globe ( <i>Raphanus sativus</i> L.)	47
48	Cabbage variety Golden Acre ( <i>Brassica oleracea</i> var. <i>capitata</i> L.)	48
49	Knol Khol variety White Vienna ( <i>Brassica oleracea</i> var. <i>gongylodes</i> L.)	49
50	Turnip variety Purple Top White Globe ( <i>Brassica rapa</i> var. <i>rapa</i> L.)	50
51	Pea variety Meteor ( <i>Pisum sativum</i> L.)	51
52	Pea variety Arkel ( <i>Pisum sativum</i> L.)	52
53	Cucumber variety Poinsette ( <i>Cucumis sativus</i> L.)	53
54	French bean variety Kentucky wonder ( <i>Phaseolus vulgaris</i> L.)	54
55	Water melon variety Sugar Baby ( <i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai)	55
56	Groundnut variety Early Runner ( <i>Arachis hypogaea</i> L.)	56

S. No.		Page No.
57	Soybean variety Lee ( <i>Glycine max</i> L.)	57
58	Castor variety Mauthners Dwarf ( <i>Ricinus communis</i> L.)	58
59	Wheat variety Sonalika ( <i>Triticum aestivum</i> L.)	59
60	Rice variety IR 8 ( <i>Oryza sativa</i> L.)	60
61	Barley variety Clipper ( <i>Hordeum vulgare</i> L.)	61
62	Faba bean variety HFB-2 ( <i>Vicia faba</i> L.)	62
63	Gerbera ( <i>Gerbera jamesonii</i> Bolus ex Hook.f.)	63
64	Gladiolus variety Snow Princess ( <i>Gladiolus spp</i> )	64
65	Rose variety First red ( <i>Rosa Hybrida</i> )	65
66	Wild Grape variety Dogridge ( <i>Vitis x champinii</i> Planch.)	66
67	Banana wild species ( <i>Musa jackeyi</i> W. Hill, <i>Musa textilis</i> Nee)	67
68	European Crab apple ( <i>Malus sylvestris</i> (L.) Mill.)	68
69	Pineapple Papaya or Mountain papaya ( <i>Vasconcellea spp.</i> )	69
70	Wild bottle gourd ( <i>Lagenaria sphaerica</i> (Sond.) Naudin)	70
71	Wild Tomato ( <i>Solanum peruvianum</i> L. , <i>Solanum pimpinellifolium</i> L.)	71
72	Wild Chilli ( <i>Capsicum chinense</i> Jacq.)	72
73	Wild Grasspea ( <i>Lathyrus spp.</i> )	73
74	Wild maize ( <i>Zea parviglumis</i> , <i>Zea diploperennis</i> , <i>Zea mexicana</i> , <i>Tripsacum</i> )	74
75	Wild cotton ( <i>Gossypium ekmanianum</i> Wittmack)	75
<b>76</b>	<b>Acknowledgements</b>	<b>76</b>
<b>77</b>	<b>Acronyms</b>	<b>77</b>





त्रिलोचन महापात्र, पीएच.डी.

सचिव, एवं महानिदेशक

**TRILOCHAN MOHAPATRA, Ph.D.**  
SECRETARY & DIRECTOR GENERAL

भारत सरकार  
कृषि अनुसंधान और शिक्षा विभाग एवं  
भारतीय कृषि अनुसंधान परिषद  
कृषि एवं किसान कल्याण मंत्रालय, कृषि भवन, नई दिल्ली 110 001

GOVERNMENT OF INDIA  
DEPARTMENT OF AGRICULTURAL RESEARCH & EDUCATION  
AND

INDIAN COUNCIL OF AGRICULTURAL RESEARCH  
MINISTRY OF AGRICULTURE AND FARMERS WELFARE  
KRISHI BHAVAN, NEW DELHI 110 001

Tel.: 23382629; 23386711 Fax: 91-11-23384773

E-mail: dg.icar@nic.in

### **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 29<sup>th</sup> July, 2022**  
**New Delhi**



# PREFACE

Plant Introduction is the most effective and commonly used method to introduce crop diversity in a new geographical region or a country. Historically, economically important plants dispersed with the movement of human beings and later due to exchanges among traders and settlers. India adopted many crops which are grown today brought by Muslim invaders, British and other European traders. Our food basket today has varied plants including those adapted here in the past and continues to expand with recent introductions like dragon fruit and monk fruit.

The concept of establishment of an agency for organised Plant Introduction was given by Late Dr. B. P. Pal way back in 1935 and it was reiterated in 1941. The systematic plant introduction activities started in 1946 with the Plant Genetic Resources (PGR) activities initiated as economic crops under a scheme in Botany Division of Indian Agricultural Research Institute (IARI) in 1946. The scheme was further strengthened as a full fledged Plant Introduction and Exploration organisation. It was later upgraded to an independent division as Plant Introduction Division in IARI in the year 1961.

After the recommendation of 'high level committee' appointed by Government of India in 1970 and through the foresight of visionaries like Dr. B.P. Pal, Dr. M.S. Swaminathan and Dr. A.B. Joshi, the Division of Plant Introduction was upgraded to an independent institute called National Bureau of Plant Introduction in August 1976 and was renamed as National Bureau of Plant Genetic Resources (NBPGR) in January 1977. One of the major mandate of NBPGR remains introduction, distribution and exchange of Plant germplasm for research purposes.

With the dedicated and consistent efforts of the Plant Introduction Division of IARI and later as NBPGR, significant introduction of new crops, new varieties, breeding material and wild species of cultivated crops have been made since 1940. The first introduction recorded as Exotic Collection (EC) Number 1 is *Cynodon plectostachyon* (Giant star grass) from Royal Botanic Gardens, Kew England on August 1, 1940. Documented records of all these introductions are maintained at Germplasm Exchange Division now known as Germplasm Exchange and Policy Unit (GEPU). All introduced plant material meant for research purpose are documented in Germplasm Exchange and Quarantine Information System (GEQIS), an online database, and the recorded number of accessions introduced by NBPGR as on July 30, 2022 is EC1129502.

The ushering in of the Green Revolution in India is the outcome of efficient exchange of wheat and rice germplasm, breeding lines and strains for development of high yielding, short statured varieties responsive to fertilizers and intensive cropping.

To this date major new crops introduced and credited to NBPGR are Kiwi fruit, sunflower, soybean, hops, sugarbeet, pepper mint, seabuckthorn, prickly pear and very recently heeng. Promising varieties of temperate fruits like apple, pear, plum, peach, grapes and vegetables like cabbage, carrot, tomato, radish and watermelon have been introduced and directly released as varieties. Several medicinal plants, industrial crops and potential crops have also been introduced for popularization among farmers like jojoba, guayule, pyrethrum, paradise tree etc. Recently emphasis is on selected crop wild relatives and wild species of different economic plants which are used as wild genepool for breeding new lines. Notable among these are species of *Triticum*, *Lathyrus*, *Cicer*, *Elymus*, *Zea*, *Capsicum*, *Vasconcella*, *Crambe*, *Brassica*, *Linum*, *Sesamum*, *Musa*, *Actinidia*, *Crocus* and others. Emphasis was to introduce species not already present in the National Gene bank at ICAR-NBPGR.

This booklet is a compilation of 75 unique and important promising introductions made by ICAR-NBPGR which have played a crucial role in diversification of Indian agriculture. These are presented in three groups representing new crops for India, promising popular varieties used as direct introductions or used in breeding new varieties, wild species and crop wild relatives. Hope this compilation is useful to all those interested in crop diversification and recognize the importance and significance of plant introductions which is relevant even today.

Date: July 30, 2022

Editors

# INTRODUCTION

Exchange of Plant Genetic Resources offers enormous opportunity for sustainable agriculture as, there is continuous need of genetic resources for developing varieties resistant to various pests and diseases and to improve quality, quantity and other value addition traits. Interdependence of countries and continents is essential for crop improvement. Even biodiversity rich regions depend for more than 30% of their food production on crops originating from other countries and this interdependence plays a very important role in international collection and exchange of germplasm. Acquisition of diverse and superior germplasm is thus an important concern. As agriculture progressed, a number of species that were not native to India were introduced from different parts of the world. Chinese, Mughals, Arabs, Spaniards, Portuguese and British introduced many crops in India. Some important examples include, coffee (*Coffea arabica* L.) from South-East Africa during 17<sup>th</sup> century; potato (*Solanum tuberosum* L.), tobacco (*Nicotiana tabacum* L.) and tomato (*Solanum lycopersicum* Mill) from South America in early 10<sup>th</sup> century; and groundnut (*Arachis hypogaea* L.) from Brazil in 15<sup>th</sup> century. Likewise, the East India Company introduced plantation crops, tea [*Camellia sinensis*(L.) O. Kuntzel], litchi [*Litchi chinensis*(Gaertn.) Sonn.] and loquat (*Eriobotrya japonica* Lindl.) from China; winter vegetables, cabbage (*Brassica oleracea* var. *capitata* L.), cauliflower (*Brassica oleracea* L. var. *botrytis* Prain) and other from the Mediterranean region; source of edible dye, annatto (*Bixa orellana* L.) and timber tree mahogany [*Swietenia mahagoni* (L.) Jacq.] from the West Indies in the 18<sup>th</sup> century.

Introduction of exotic germplasm has enriched the Indian agriculture since times immemorial. Short statured, lodging resistant, input responsive, high yielding introductions of wheat and rice played a pivotal role in ushering in the era of Green Revolution; and those carrying cytoplasmic-nuclear male sterility and fertility restoration genes brought in the era of hybrid breeding in crops like sorghum, pearl millet and rice that enabled the exploitation of heterosis. Further, it was the introduced germplasm that enabled soybean and sunflower to become major field crops. Germplasm introductions have had tremendous impact on Indian agriculture. Significant primary introductions and selections include wheat varieties Ridley (Australia), Lerma Rojo-64 (Mexico), Sonora 64 (Mexico); rice varieties IR 8, IR 20, IR 36, IR 50 introduced from Philippines; Oat varieties Kent (Australia), Rapida (USA); Pea varieties Bonneville (USA), Early Badger (USA), Arkel (UK), Harbhajan (Portugal); Cowpea varieties Pusa Barsati (Philippines), Pusa Phalguni (Canada); French bean varieties Kentucky wonder (USA), Contender (USA); Soybean varieties Bragg and Lee from USA; Sunflower varieties Peredovik ( erstwhile USSR); tomato varieties La Bonita (USA), Dwarf Money maker (Israel); Onion varieties Pusa Ratnar and Early Grano from USA; Cabbage varieties Pusa drumhead (USA) and Golden Acre (Denmark). New crops/germplasm introductions during the last century have tremendous impact on Indian agriculture.



The story of plant Introduction in India began with the creation of centralized Plant Introduction agency in 1946 at Indian Agricultural Research Institute (IARI) in the Division of Botany, ICAR, New Delhi. In 1956 under second five year plan it was expanded as Plant Introduction and Exploration organization in the Botany Division. In 1961, further upgraded into an independent Division of Plant Introduction, IARI, New Delhi. In 1976, to an independent institute as National Bureau of Plant Introduction (NBPI) and in 1977, rechristened as National Bureau of Plant Genetic Resources (NBPGR). The Bureau as a single window system is responsible for introduction and maintenance of germplasm of agricultural and horticultural plants. The import into India of any seed/planting material for research purposes in small quantities is governed by Plant Quarantine (Regulation of Import Into India) Order, 2003 or PQ Order, 2003 ([www.plantquarantineindia.org](http://www.plantquarantineindia.org)). The PQ Order as laid down as per New Policy on Seed Development (1989) and accordingly, the Government of India has made it obligatory for all plant breeders and researchers intending to receive seed/planting materials, from other countries to obtain Import Permit and phytosanitary certificate from the exporting country before importing any seed/planting material into the country. Director, ICAR-NBPGR has been authorized to issue import permit and receive imported materials from custom authorities for its quarantine inspection and clearance. The indenter desirous of importing seed/planting material has to apply to the Director, NBPGR on a prescribed application form. In addition to NBPGR, there are some other agencies concerned with plant introduction. Forest Research Institute, Dehradun has a plant Introduction section which looks after the introduction; maintenance and testing of germplasm of forest trees. Central Research Institute for various crops e.g. tea, coffee, sugarcane, potato, tobacco, cassava, coconut, rubber etc. introduce test and maintain plants material of interest, but their activities are coordinated by NBPGR which has the ultimate responsibility for introduction activities. Plant materials may also be introduced by individual Scientist, Universities and other research organizations, but all the introductions in India must be routed through the NBPGR, New Delhi. Since its establishment NBPGR, has been instrumental in providing the plant genetic resources (PGR), exotic as well as indigenous collections for crop improvement programmes in the country. Since 1976, it has imported more than 39 lakh accessions of various agricultural and horticultural crops. This compilation is for the selected 75 important and unique accessions imported/ introduced by ICAR-NBPGR.

## KIWI FRUIT

### *Actinidia chinensis* Planch.

Introduced from	:	New Zealand
Native	:	New Zealand
Year of introduction	:	1969
Established at	:	ICAR NBPGR Regional Station, Shimla and Bhowali
National Identity Number	:	EC64090

The fruit got its name as a result of a designed marketing campaign in New Zealand in 1959. It was introduced at Shimla station of NBPGR from New Zealand in 1960's. The popular varieties Abbott, Hayward, Matua, Tomuti were introduced at the station. Kiwis have grown in popularity since their first appearance in Shimla's chilly hills. Much to the delight of farmers, the fruits ship and store well. Several commercial varieties of kiwis are grown throughout India's cooler regions, including Uttar Pradesh, Himachal Pradesh, Sikkim, Jammu and Kashmir, Arunachal Pradesh, Meghalaya, and the Nilgiri Hills. Of these areas, Himachal Pradesh produces some of the best kiwis. The two most commonly available varieties are green kiwis and golden kiwis. Despite its off-putting fuzzy brown skin, kiwi's flesh is very attractive green, juicy with small edible black seeds and robust flavours. Kiwis have several health benefits, the fruit is rich in antioxidants, polyphenols and ascorbic acid. It has got a very special place in the fruit basket of India.



Photo Courtesy : ICAR-NBPGR RS, Shimla

## DRAGON FRUIT

### *Hylocereus undatus* (Haw.) Britton & Rose

Introduced from	:	USA
Native	:	Mexico and Central America
Year of introduction	:	1970
Established at	:	ICAR-NIASM,Baramati; ICAR-CIARI. Port Blair
National Identity Number	:	EC91658

The dragon fruit (*Hylocereus* sp.), a new introduction in India, is highly valued for its reported nutraceutical properties. The juicy flesh of the fruit is delicious in taste. Five different collections of dragon fruit are collected and established at the experimental farm of Central Inland Agricultural Research Institute. The area under dragon fruit cultivation has increased by leaps and bounds.. A potential crop for abiotic stress areas, low maintenance, high profitability and export potential crop.



Photo Courtesy : <https://krishi.icar.gov.in/jspui/>

## KINNOW MANDARIN

### *Citrus nobilis X Citrus deliciosa*

Introduced from	:	USA
Native	:	USA
Year of introduction	:	1970
Established at	:	ICAR-CICR Nagpur; PAU, Ludhiana
National Identity Number	:	EC92780

The Kinnow mandarin was introduced from the USA by Dr J.C. Bakhshi which became one of the most promising introductions in India. Kinnow mandarin is the first generation hybrid between King (*Citrus nobilis* Lour) and Willow leaf (*Citrus deliciosa* Tenora). It was developed by H.B. Frost at the University of California, Citrus Experiment Station, Riverside, Davis (USA) in 1915 and released for commercial cultivation during the year 1935. This hybrid revolutionized the citrus industry of India, Pakistan and Bangladesh owing to its beautiful golden-orange fruits, higher productivity and economic returns. Sri Ganganagar district of Rajasthan excels in Kinnow production. Besides Ganganagar, Kinnow is also commercially cultivated in Punjab, Haryana, NCR region of Delhi including Dhaulakuan district of Himachal Pradesh.



Photo Courtesy : Division of Fruits & Horticultural Technology, ICAR-IARI, New Delhi

## MONK FRUIT

### *Siraitia grosvenorii* (Swingle) C.Jeffrey ex A.M. Lu & Zhi Y. Zhang

Introduced from	:	China
Native	:	China
Year of introduction	:	2018
Established at	:	CSIR-IHBT, Palampur
National Identity Number	:	EC938819

The fruit is known as Luo Han Guo in China where the fruit pulp is eaten and the thin skin is used to make tea. The fruit pulp is traditionally used in China for the treatment of dry cough, sore throat, and minor stomach and intestinal troubles. The sweet taste of monk fruit pulp and juice is due to the presence of mogrosides and has several health-promoting properties including immune enhancement, anti-oxidation, anti-diabetes, anti-tumour and anti-inflammation. Mogrosides are purified and used as non-caloric, non-sugar sweetener in the United States and Japan, as they are approximately 300 times sweeter than sucrose. The potential of monk fruit as a functional food can be utilised in India as well.



Photo Courtesy : CSIR-IHBT, Palampur

# AVOCADO

## *Persea americana* Mill.

Introduced from	:	Sri Lanka
Native	:	Mexico and Central America
Year of introduction	:	1964
Established at	:	ICAR-NBGR Regional Station Bhowali
National Identity Number	:	EC31529

In India, it was introduced from Sri Lanka in the early part of the twentieth century. In a very limited scale and in a scattered way it is grown in Tamil Nadu, Kerala, Maharashtra, Karnataka in the south-central India and in the eastern Himalayan state of Sikkim. It can not tolerate the hot dry winds and frosts of northern India. Climatically, it is grown in tropical or semitropical areas experiencing some rainfall in summer, and in humid, subtropical summer rainfall areas. All three horticultural races adapted to tropical and sub-tropical conditions i.e. West Indian, Guatemalan and Mexican have been tried in India. The varieties Fuerte, Bacon, Zutano, Hass, Booth 7, Booth 8, Sharwil and Ettinger are reported to be promising. The varieties Pollock, Waldin, Nabal, Linda, Puebla, Gottfreid, Collins, Booth 8 and Fuerte are recommended for commercial cultivation. The varieties that are cultivated in India go by several names, such as Purple, Green, Fuerte, Pollock, Peradeniya Purple Hybrid, Trapp, Round and Long. Among the several existing varieties, perhaps Fuerte is the most widely grown, but it is regarded as unsuitable for the tropics. Avocado is planted mainly in coffee- based cropping systems as one of the mixed crops in Kodagu District. The avocado cultivation has gained an overwhelming popularity from the last one decade due to its nutritional properties and high market demand. Now avocado cultivation has been started and entering into commercial scale production in this region and the similar places.



Photo Courtesy : Dr K M Rai, ICAR-NBGR RS, Bhowali

## BUSH MANGO

### *Irvingia gabonensis* (Aubry-Lecomte ex o' Rorke) Baill.

Introduced from	:	USA
Native	:	West Africa
Year of introduction	:	2003
National Identity Number	:	EC534351-54

The fruit is similar to a mango with edible yellow fruit and valued for its oil rich seeds, fresh fruit, fuel, fibre, medicines and hardy green termite resistant wood. The crop is still under domestication and grown in forest, agroforestry system and in kitchen garden only. The plant offers considerable scope for enhancing the nutritional and economic security of subsistence farmers in India. Owing to its immense potential to perform well under adverse agro-climatic condition and poor and marginal soil as well it proves to be potential multipurpose fruit tree.



Photo Courtesy : <https://www.alibaba.com/product-detail>

## PECAN NUT

### *Carya illinoensis* (Wangenh.) K. Koch.

Introduced from	:	USA
Native	:	Mexico and USA
Year of introduction	:	1963
Established at	:	ICAR-NBPGR, Regional Station, Shimla
National Identity Number	:	EC024558

Pecan nut is the one of the most important temperate nuts grown in India. In India, it is mainly grown in Jammu and Kashmir, and Himachal Pradesh. It is high yielding and prolific-bearer, nuts are thin-shelled. Kernel is amber-coloured having oil (7.4%) and protein (7.50%) Nuts are edible as fresh or in cooking, with a rich buttery flavour. Cutivar ‘Mahan’ has one of the largest nuts. Its large nut size and thin shell give it a surprisingly high percent kernel (53%). Kernels seldom reach the end of the nut, making it one of the lowest in percent fill and specific gravity. Mahan’ has been used extensively in breeding.



Photo Courtesy : ICAR-NBPGR RS, Shimla

## PINEAPPLE GUAVA

### *Feijoa sellowiana* Berg.

Introduced from	:	USSR & New Zealand
Native	:	South America
Year of introduction	:	1963 (USSR) & 1980 (USA)
Established at	:	ICAR-NBPGR, Regional Station, Shimla
National Identity Number	:	EC24526, EC137927

An evergreen shrub, flower pinkish fruits green ripens in September-October. Starts bearing fruits in 5<sup>th</sup> year of planting and yields about 10-15 kg fruits/plant. Fruits sub-acidic in taste with average fruits weight 25 g and TSS 11%. Propagated through seeds, cuttings layering and grafting. Eaten fresh, made into pickle, jam and jelly. The sweet fleshy, white and purplish flower petals are added to salad. Feijoas are beautifully aromatic when ripe. Like other guava varieties, they too emit a musky, sweet, strong and unique fragrance. This scent grows stronger as it nears peak ripeness. Feijoa grows best in regions with low humidity and a subtropical climate. In India, feijoas grow alongside other guava cultivars in Uttar Pradesh and Bihar. Feijoas also grow in the Kodaikanal hills and the Nilgiri station hills in south India.



Photo Courtesy : <https://www.wikipedia.org/wiki/feijoa>

## HUSK TOMATO (TOMATILLO)

### *Physalis ixocarpa* Brot. ex. Hornem.

Introduced from	:	USA
Native	:	South America
Year of introduction	:	2001
Established at	:	ICAR-NBPGR, Regional Station, Shimla
National Identity Number	:	EC467441

Annual, spreading, 3-6 feet tall. Fruit yellowish-green or purplish up to 4 cm in diameter. Flesh crispy, Pale yellow, sub-acidic. TSS 8.0 % yields upto 125 fruit/plant, rich in protein and phosphorus. Propagation is by seeds. Fruit eaten fresh or cooked suitable for making good quality jam hence also called “Jam berry”. It is cultivated in the northwest desert region of Rajasthan.



Photo Courtesy : <https://www.britannica.com/plant/tomatillo>

10

## LEEK VAR COPENHAGEN MARKET EMPERIAL

### *Allium ampeloprasum* Thunb.

Introduced from	:	UK
Native	:	Eastern Mediterranean lands and the Middle East
Year of introduction	:	1994
Established at	:	ICAR-NBPGR; ICAR-IARI, New Delhi
National Identity Number	:	EC376020

The plant is related to the onion and has a mild, sweet, onion like flavour. Mostly grown in home gardens in India. Variety Copenhagen Market Emperial is hardy biennial plant grown as a vegetable. It has a mild, sweet, onion like flavour. Stalks are widely used in European soups and stews, especially as a complement to potatoes, and can be cooked whole as a vegetable.



Photo Courtesy : Division of Vegetable Science , IARI, New Delhi

## PILI NUT

### *Canarium ovatum* Engl.

Introduced from	:	USA
Native	:	Philippines
Year of introduction	:	1996
Established at	:	ICAR-NBGR Regional Station, Thrissur
National Identity Number	:	EC389184

Pili nut is an attractive, symmetrically shaped evergreen tree that can grow up to 25 metres tall. A very important food in its native area, the edible seed has been exported to several other countries in the past. The tree also provides other foods, medicines and various materials for the local population. Its wood is harvested commercially as sources of ‘kedondong’ timber. The sweet nuts have a delicious flavour. When raw, their flavour resembles roasted pumpkin seed, when roasted their mild, nutty flavour and tender, crispy texture are superior to the almond. They can also be used in confections, ice cream, nut milks etc, and as an adulterant to chocolate.



Photo Courtesy : ICAR-NBGR RS, Thrissur

## SUNFLOWER

### *Helianthus annuus L.*

Introduced from	:	USSR
Native	:	USA
Year of introduction	:	1960
Established at	:	ICAR-IIOR, Hyderabad
National Identity Number	:	EC16070

Sunflower was introduced in India as an oilseed crop for the first time in 1960s, but it was grown in India as ornamental plant since ancient times. Two introduced varieties, namely Peredovik and Aramvirikij introduced from erstwhile USSR were also released for cultivation as such. The varieties were early maturing with oil content (47.9 to 49.1%). Six states with Karnataka in the lead are the major producers of sunflower in the country. Sunflower production follows a systemic weather risk as about 80 per cent of the area is under rain-fed production.



Photo Courtesy : Germplasm Exchange and Policy Unit, ICAR-NBGR, New Delhi

# OIL PALM

## *Elaeis guineensis* Jacq.

Introduced from	:	Malasiya & Zambia
Native	:	Africa
Year of introduction	:	1995 (Zambia) & 2015 (Malasiya)
Established at	:	ICAR - Indian Institute of Oil Palm Research, Eluru
National Identity Number	:	EC382645 & EC869413

Malaysian variety having short rachis with small crown and high carotene content, drought tolerant and considerably low level of Free Fatty Acid (FFA). Oil palm has been established as a successful crop in a number of states in the country. The major oil palm producing states in India are Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, Gujarat, Chhattisgarh, Mizoram, Assam and Orissa. Andhra Pradesh ranks 1st in Area and Production of Oil Palm in the country.



Photo Courtesy: ICAR-IOPR, Eluru

## PARADISE-TREE

### *Simarouba glauca* DC

Introduced from	:	El salvador
Native	:	Florida, South America and the Caribbbbean
Year of introduction	:	1961
Established at	:	ICAR- NBPGR Reginal Station, Thrissur
National Identity Number	:	EC19701

The wood is generally insect resistant and is used in the preparation of quality furniture, toys, matches, as pulp (in paper making). It can be also used for industrial purposes in the manufacture of biofuel, soaps, detergents, lubricants, varnishes, cosmetics, and pharmaceuticals. The tree forms a well-developed root system and dense evergreen canopy that efficiently checks soil erosion, supports soil microbial life, and improves groundwater position. Besides converting solar energy into biochemical energy all-round the year, it checks overheating of the soil surface all through the year and particularly during summer. Large-scale planting in wastelands facilitates wasteland reclamation, converts the accumulated atmospheric carbon dioxide into oxygen and contributes to the reduction of greenhouse effect or global warming.



Photo Courtesy : ICAR-NBPGR RS, Thrissur

## JOJOBA

### *Simmondsia chinensis* C. K. Schreid.

Introduced from	:	USA
Native	:	Mexico and USA
Year of introduction	:	1972
Established at	:	ICAR-NBPGR Regional Station, Jodhpur
National Identity Number	:	EC99689

Also referred as the Desert Gold is a multipurpose oil seed crop for use in Industry. It is a major source of income for both local farmers in jojoba oil trade. Jojoba has very promising scope for cultivation in desert ecosystem even in the relatively hot weather. Its nature withstand warm weather in summer and cold weather in winter at low fertility of soil. The plant need less amount of water compared to other economic crop like olive plant with great ability to withstand in high salt in soil. The commercial plantation of jojoba is encouraging mainly in Thar Desert in India. Seed hulls can be used as a mulch or protective ground cover to reduce evaporation, erosion and weed growth and can be used as fertilizers and soil replenisher for the soil which is low in organic matter.



Photo Courtesy : ICAR-NBPGR RS, Jodhpur

## QUINOA

### *Chenopodium quinoa* Willd.

Introduced from	:	Argentina / USA
Native	:	South America
Year of introduction	:	1951
Established at	:	AICRN Potential Crops, NBPGR, New Delhi
National Identity Number	:	EC3164, EC3262

Quinoa is a new addition to our fruit basket. It is used as a potential high protein nutrient rich breakfast food. Quinoa is suitable for its cultivation during the Rabi season in the Northern plains, Western India and parts of the deccan plateau. The seeds are rich in protein, dietary fiber, B vitamins, and dietary minerals in amounts greater than in many grains. It has broad, generally powdery, hairy, lobed leaves, normally arranged alternately. The woody central stem is branched or unbranched and may be green, red or purple. The flowering panicles arise from the top of the plant or from leaf axils along the stem. This is the first variety of quinoa developed using exotic parent in the country.

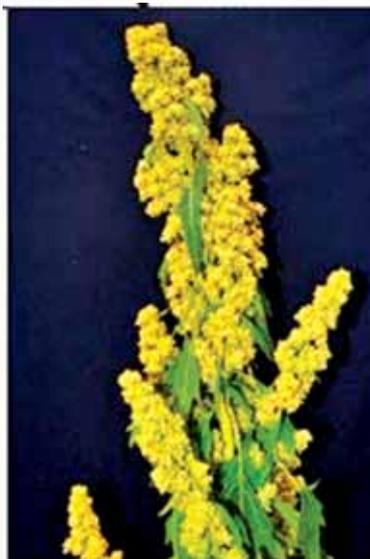


Photo Courtesy : AICRN Potential Crops, ICAR-NBPGR, New Delhi

## BAMBARA GROUNDNUT

### *Vigna subterranea* (L.) Verdc

Introduced from	:	Ghana
Native	:	Nigeria
Year of introduction	:	1964
Established at	:	ICAR-IGFRI Jhansi; ICAR-NBPGR New Delhi
National Identity Number	:	EC27879

A drought tolerant nutritional crop, suitable both as food and forage crop. It is a short duration hardy crop suitable for poor soils. It needs to be popularized in arid parts of the country. Its seeds also consumed after roasting like groundnuts in parts of Africa.

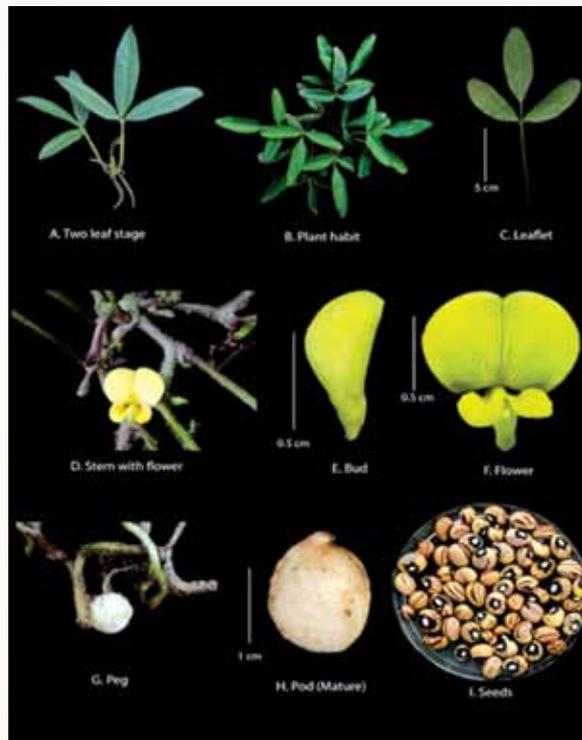


Photo Courtesy : Dr Kuldeep Tripathi et al; ICAR-NBPGR

## MARAMA BEAN

### *Tylosema esculentum* (Burch.)A. Schreib.

Introduced from	:	South Africa
Native	:	South Africa
Year of introduction	:	1980
Established at	:	ICAR-IGFRI Jhansi; ICAR-NBPGR, New Delhi
National Identity Number	:	EC137778

The plant is a significant food-source for the people of the Kalahari Desert, because of the high protein and oil content of its large seeds (20-30gm each). The seeds are usually roasted, can also be ground or boiled. The beans keep well, due to their hard outer shell. The tuber is also edible, but needs to be harvested from young plants (one or two years old) - after this age the tuber becomes dry and fibrous. The nutritional value of the marama bean is very high for an unimproved legume. The tubers have a high protein content of 9.0% and also have a high amino acid content. Also the grain is relatively high in protein with a share of 30-39%. The concentration of sulphur-containing amino acids is high as well (with a lysine content of 5.0% and a methionine content of 0.7%). comparable soybeans, which have a content of 38-40%.



Photo Courtesy : <https://www.southernafricanplants.net/photocollection>

## PERUVIAN LILY/ LILY OF THE INCAS

### *Alstroemeria aurea* Graham

Introduced from	:	UK
Native	:	South America
Year of introduction	:	1959
Established at	:	ICAR-CITH, Regional Station, Mukteshwar
National Identity Number	:	EC14789

*Alstroemeria* is a potential cut flower with a prestigious place in the international market. It was introduced in India as a potential new cut flower crop for mid hills. It is getting popularity in domestic flower trade as an elegant cut flower with long-lasting quality even at ambient conditions. *Alstroemeria* is available in myriads of colours and hues of pink, yellow, red, orange etc. Cultivars like Alladdin, Serena, Riana, Amor, Capri, Cindrella, Rosita, Pluto etc. could successfully be grown under low-cost polyhouses in the hilly areas.



Photo Courtesy : Germplasm Exchange and Policy Unit, ICAR-NBPGR, New Delhi

## ASAFOETIDA OR HEENG

### *Ferula assa-foetida* L.

Introduced from	:	Iran
Native	:	Central Asia, eastern Iran to Afghanistan,
Year of introduction	:	2018
Established at	:	CSIR-IHBT, Palampur
National Identity Number	:	EC966538, EC968466-70

Asafoetida or *Heeng* is prized as a condiment in India and other parts of the world. It is grown chiefly in Iran and Afghanistan, from where it is exported to the rest of the world. Though asafoetida is not native to India, but used in Indian medicine and cookery since long. The economic product from asafoetida plants is the oleo-gum resin exudate from roots. It is known to be beneficial in asthma, whooping cough, chronic bronchitis, digestive disorders etc. Several efforts were made since 1960's to introduce this species from countries like Germany, France, Italy and the USA. This is for the first time when the germplasm introduced from Iran have successfully established at CSIR-IHBT and 800 saplings have been planted in the cold desert region of Lahaul and Spiti under the aegis of the State Department of Agriculture, Himachal Pradesh.



Photo Courtesy : CSIR-IHBT Palampur

## PRICKLY PEAR/EDIBLE CACTUS

### *Opuntia ficus indica* (L.) Mill.

Introduced from	:	Mexico
Native	:	Mexico
Year of introduction	:	2003
Established at	:	ICAR-CIAH, Bikaner
National Identity Number	:	EC527043

Fruits of prickly pear are edible with flavourful fruits having sweet and sour taste. Cactus cladode is rich in pectin, mucilage, minerals, polyphenols, nicotiflorin, vitamins, polyunsaturated fatty acids and amino acids. Cultivation of cactus pear started long back in many countries of the world but, in India, its commercial cultivation is yet to start. Research on planting methods, performance of various accessions, exploitation and uses of vegetable type cactus and biomass production was initiated at CIAH, Bikaner. Micropropagation technique of spine-less, vegetable type cactus pear (nopal cactus) was standardized by ICAR- CIAH, Bikaner in 2009. Several value added and culinary products from cactus pear have been developed at CIAH, Bikaner for making this crop more remunerative.



Photo Courtesy : [https://ciah.icar.gov.in/publication/Technical\\_bulletin/2018/cactus-pear.pdf](https://ciah.icar.gov.in/publication/Technical_bulletin/2018/cactus-pear.pdf)

## PRINCE-OF-WALES FEATHER OR PRINCE'S-FEATHER

### *Amaranthus hypochondriacus* L.

Introduced from	:	Russia
Native	:	Mexico
Year of introduction	:	2003
Established at	:	ICAR-NBPGR Regional Station Shimla
National Identity Number	:	EC519515

Originally endemic to Mexico, it is valued as source of food. The leaves and seeds are very nutritious and have a mild flavor . In temperate regions, it is cultivated as a half-hardy annual. It is a vigorous, upright plant that typically reaches 40–200 cm (15–80 in) tall. It is often grown for its flowers, which appear in dense, catkin- like inflorescences in the summer and autumn. They are usually deep purplish-red, but may be yellow-green.



Photo Courtesy : ICAR-NBPGR, RS Shimla

# HOPS

## *Humulus lupulus* L.

Introduced from	:	France
Native	:	Europe, western Asia and North America
Year of introduction	:	1967
Established at	:	ICAR-IIHR, Bangalore; ICAR-IIVR, Vranasi
National Identity Number	:	EC38803

It is a perennial, herbaceous climbing plant which sends up new shoots in early spring and dies back to a cold-hardy rhizome in autumn. The female cone-shaped fruits from *H. lupulus* are used by breweries to preserve and flavor beer, and so *H. lupulus* is widely cultivated for use by the brewing industry. The fragrant flower cones, known as hops, impart a bitter flavor, and also have aromatic and preservative qualities. Many modern high alpha hops were developed from Brewer’s Gold. Has a resinous, spicy aroma/ flavor with hints of black currant. Recently, young shoots and cones used as a vegetable is also gaining popularity.



Photo Courtesy : <https://commons.wikimedia.org>

## APPLE VARIETY MANTET

*Malus domestica* Borkh.

Introduced from	:	Netherlands
Native	:	Canada
Year of introduction	:	1975
Established at	:	ICAR-NBPGR Regional Station, Shimla
National Identity Number	:	EC114118

Mantet is a cone-shaped apple of regular shape weighing from 90 to 180 g. It is distinguished by pronounced ribbing of the upper and lower parts, the middle part is smooth. The peel is smooth, dense, thin yellowish-green, the blush on these apples is manifested by bright red spots, vertical stripes. It has juicy creamy pulp, possibly greenish, pink shades at different stages of fruit ripeness.



Photo Courtesy : ICAR-NBPGR RS, Shimla

## APPLE VARIETY FUJI

### *Malus domestica* Borkh.

Introduced from	:	Japan
Native	:	Japan
Year of introduction	:	1987
Established at	:	ICAR-NBPGR Regional Station, Shimla
National Identity Number	:	EC202826

Fuji is a Japanese variety of apple with juicy fruits, high yield, and good keeping quality. This was developed by growers at Tohoku Research Station in Fujisaki, Aomori, Japan, in the late 1930s, through a cross between two American apple varieties—the Red Delicious and old Virginia Ralls Janet. Fuji apples are typically round and range from large to very large, upto 7.5 cm in diameter. They contain between 9–11% sugars by weight and have a dense flesh that is sweeter and crisper than many other apple cultivars, making them popular with consumers around the world. Fuji apples also have a very long shelf life compared to other apples, even without refrigeration. With refrigeration, Fuji apples can remain fresh for up to a year.



Photo Courtesy : Germplasm Exchange and Policy Unit, ICAR-NBPGR, New Delhi

## APPLE VARIETY SCARLET SPUR

### *Malus domestica* Borkh.

Introduced from	:	USA
Native	:	USA
Year of introduction	:	2003
Established at	:	ICAR-NBPGR Regional Station, Shimla
National Identity Number	:	EC513655

This is a spur type variety suitable for low hills. The tree is medium sized, slow growing and very productive. Fruit is excellent in size with bright scarlet red colour skin colour. The flesh is crispy, cream in color, sweet and juicy. It performs well in altitude range of 4500-6500 feet above mean sea-level. It has become one of the most promising commercial cultivar of hilly regions in India particularly Himachal Pradesh.

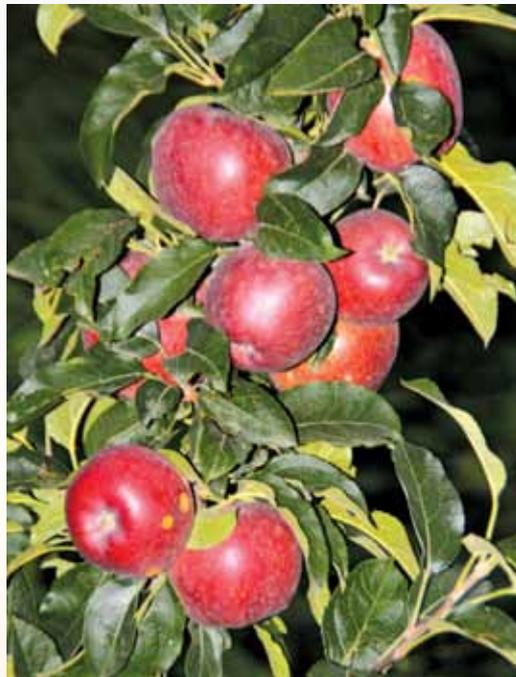


Photo Courtesy : ICAR-NBPGR RS, Shimla

## GRAPE VARIETY FLAME SEEDLESS

### *Vitis vinifera* L.

Introduced from	:	Australia
Native	:	USA
Year of introduction	:	1984
Established at	:	ICAR-IIHR, Bangalore; ICAR-IARI, New Delhi & ICAR- NRC Grapes, Nagpur
National Identity Number	:	EC159387

The Flame Seedless is a vigorous, heavy-bearing table grape cultivar that keeps well in storage. It produces large clusters of medium-large red grapes with a sweet flavour. Flame Seedless requires a long growing season. Berries are tender and firm, red coloured rich in anthocyanin. This is one of the most popular varieties grown commercially in India.



Photo Courtesy : Division of Fruits & Horticultural Technology, ICAR-IARI, New Delhi

## GRAPE VARIETY THOMPSON SEEDLESS

### *Vitis vinifera* L.

Introduced from	:	USA
Native	:	USA
Year of introduction	:	1964
Established at	:	ICAR-IIHR, Bangalore; ICAR-IARI, New Delhi & ICAR- NRC Grapes, Nagpur
National Identity Number	:	EC28398

Thompson Seedless is one of the most important primary introductions in India. This variety is grown in Maharashtra, Andhra Pradesh, Tamil Nadu and Karnataka. It has wide adaptability with seedless, ellipsoidal-elongated, golden-yellow berries with medium-thin skin. The juice is straw coloured, sweet with a TSS of 20-22%. Variety has a good keeping quality and is used for table purpose and raisin making. Average yield is 20-25 t/ha. Its superior clones namely Sonaka, Taste-Ganesh, Perlette, Sharad Seedless remain the leading varieties in Indian export market. Currently, Thompson Seedless is the ruling grape variety of India occupying 55% of the area with its clones.



Photo Courtesy : Division of Fruits & Horticultural Technology, ICAR-IARI, New Delhi

## GRAPE VARIETY PERLETT

### *Vitis vinifera* L.

Introduced from	:	USA
Native	:	FRANCE
Year of introduction	:	1964
Established at	:	ICAR-IIHR, Bangalore; ICAR-IARI, New Delhi & ICAR-NRC Grapes, Nagpur
National Identity Number	:	EC28410

This is an important primary introduction in grape. This variety is grown in the states of Punjab, Haryana and Delhi. Berries are seedless, small sized, spherical to slightly ellipsoidal and yellowish-green in colour. The juice is clear and green with 16-18% TSS. Keeping quality is good and is used for table purpose. Variety is not suitable for raisins due to compactness of clusters. Average yield is up to 35 t/ha.



Photo Courtesy : Division of Fruits & Horticultural Technology, ICAR-IARI, New Delhi

## GRAPE VARIETY BEAUTY SEEDLESS

### *Vitis vinifera* L.

Introduced from	:	USA
Native	:	USA
Year of introduction	:	1964
Established at	:	ICAR-IIHR, Bangalore; ICAR-IARI, New Delhi & NRC Grapes, Nagpur
National Identity Number	:	EC28389

Beauty Seedless has been developed and released by H.P. Olmo at the University of California, Davis in 1954. Berries are tender and firm, reddish black, that mature early-mid season. It has large bunches. Berry length may vary from 18-20 cm. The fruits are rich in anthocyanin. This is one of the most popular varieties grown commercially in northern India.



Photo Courtesy : Division of Fruits & Horticultural Technology, ICAR-IARI, New Delhi

## NECTARINE VARIETY SNOW QUEEN

### *Prunus persica* (L.) Batsch.

Introduced from	:	USA
Native	:	UK
Year of introduction	:	2004
Established at	:	ICAR-NBPGR Regional Station, Shimla
National Identity Number	:	EC552642

Snow Queen is a promising introduction which gave impetus to nectarine cultivation in India. It is a juicy nectarine known as smooth skin peach. Fruits are sweet, red skinned and juicy. Fruit weight range from 50-55g, TSS 14<sup>o</sup> Brix, acidity 0.78 % and total sugars is 10.92 % . A 6 year old plant may yield 12-13 kg fruit/plant. Fruits are rich source of lycopene, lutein, vitamin A and vitamin C. The major growing areas for nectarines are Nilgiris, Jammu and Kashmir, Himachal Pradesh, Uttarakhand and Punjab. In recent times Himachal Pradesh has become a suitable place for its cultivation due to high quality and regular production. Introduction of cultivars such as Snow Queen, Silver King, May Fire, Red Gold and Independence have attracted farmers attention for cultivation of nectarines in the mid hills of Himachal Pradesh.



Photo Courtesy : ICAR-NBPGR RS, Shimla

## NECTARINE VARIETY SUNRED

### *Prunus persica* ( L.) Batch

Introduced from	:	USA
Native	:	China
Year of introduction	:	1968
Established at	:	ICAR-NBPGR Regional Station, Shimla
National Identity Number	:	EC52145

Peach/ Nectarine cultivar Sunred produces medium-sized fruits with a firm, yellow flesh that is packed with sweetness and flavor. Sunred peaches are popular for its low chill requirements and red fruits. They are delicious for fresh eating, used in ice cream, pies, jams and jellies. This low chilling variety became very popular in mid hills and northern plains of India. Other low chilling peach varieties like Florida Sun and Sun Gold were also introduced from USA and have been recommended for commercial cultivation for the plains of Punjab and adjoining areas.



Photo Courtesy : ICAR-NBPGR RS, Shimla

## PERSIMMON VARIETY FUYU/FUYA

### *Diospyros kaki L. f.*

Introduced from	:	Japan
Native	:	Japan
Year of introduction	:	2004
Established at	:	ICAR-NBPGR Regional Station, Shimla
National Identity Number	:	EC552663

Fuyu is a Japanese variety of Persimmon. It is the best variety of persimmon with firm flesh and nonastringent flavor. It is high in vitamin A and has more vitamin C than citrus. A medium-size, flattened fruit resembling a yellow tomato, “Fuyu,” like other Japanese and Chinese persimmons, produces seedless fruit that has the consistency of custard when ripe and is often eaten with a spoon. Its skin is deep orange and its flesh is light orange. It is an excellent keeper. Fuyu persimmon trees are generally free of serious pest and diseases. The tree is well established at NBPGR- RS Shimla.



Photo Courtesy: ICAR-NBPGR RS, Shimla

## PLUM VARIETY SANTA ROSA

### *Prunus domestica* Thunb.

Introduced from	:	Australia
Native	:	USA
Year of introduction	:	2003
Established at	:	ICAR- NBPGR, Regional Station, Bhowali
National Identity Number	:	EC529561

In north India high quality plum is being grown in hilly area of Himachal Pradesh, Jammu and Kashmir, Uttarakhand and Uttar Pradesh. Santa Rosa is one of the most preferred cultivars for plum production in India. The fruits are attractive dark red coloured with golden firm flesh. Fruit characters include fruit weight 56.61 g, pulp weight 54.60 g and Total Soluble Solids content 21.1°B. Santa Rosa is the predominant plum cultivar grown over 90 percent of the total area under plum cultivation in Himachal Pradesh. In the plains low chilling requiring plum cultivars are cultivated throughout Punjab, Haryana and in some parts of Uttar Pradesh and Rajasthan.



Photo Courtesy : <https://www.waimeanurseries.co.nz/>

## BLACKBERRY VARIETY BLACK SATIN

### *Rubus fruticosus* Marshall

Introduced from	:	USA
Native	:	N., Central & E. Europe
Year of introduction	:	1994
Established at	:	ICAR-NBPGR Regional Station, Srinagar
National Identity Number	:	EC381258

The ripe fruit is commonly used in desserts, jams, jelly, wine and liqueurs. It may be mixed with other berries and fruits for pies and crumbles. Blackberries are also used to produce candy. All parts of plant have been used for medicinal purposes; fruit is rich in Vitamin C, fibre, vitamin K, Omega 3 and Omega 4 fat as well as protein dietary fibre, carotenoids, ellagitannins and ellagic acid.



Photo Courtesy : ICAR NBPGR RS, Srinagar

## BANANA VARIETY GRAND NAINÉ

### *Musa acuminata* Colla

Introduced from	:	France
Native	:	South East Asia
Year of introduction	:	1988
Established at	:	NRC Banana Trichy; ICAR-NBPGR, New Delhi
National Identity Number	:	EC272378

Grand Naine bananas are one of the most commonly cultivated bananas and a member of the commercial Cavendish banana cultivar group. Grand Naine stands up to problems, including strong winds. The fruits of variety are delicious to eat and keeping quality of the fruit is high compared to native varieties, these creamy white bananas are fastest-producing banana variety. Basically a tropical crop grows well in varied temperature ranging from humid tropical to dry mild subtropics. It is a moisture- and heat-loving plant and cannot tolerate frost or arid conditions.

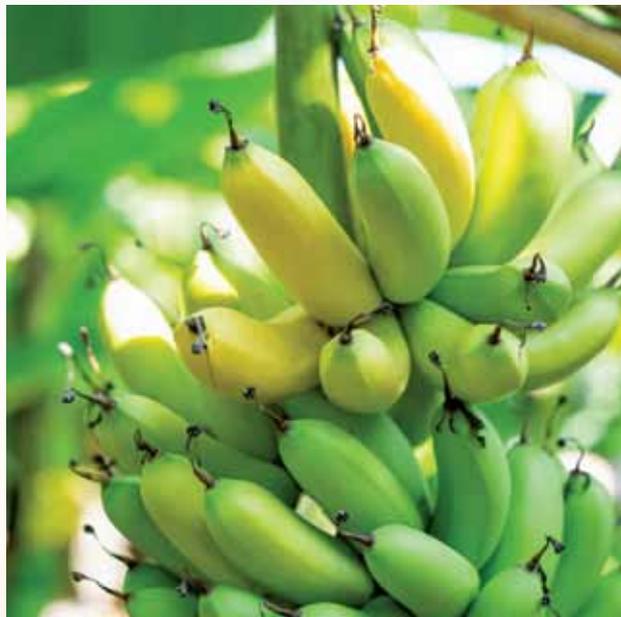


Photo Courtesy: <https://mybageecha.com>

## PAPAYA VARIETY RED LADY

### *Carica papaya* L.

Introduced from	:	China
Native	:	Mexico
Year of introduction	:	2006
Established at	:	IARI, New Delhi; ICAR- IIHR, Bangalore
National Identity Number	:	EC583170

Red lady papayas are a high yielding papaya variety. They have green skins that turn yellow when ripe, though the fruit can be eaten when the skin is about halfway from green to yellow. They have vibrant salmon-colored flesh with a sweet aroma and melon-like flavor. Their inner cavity is filled with small, round black seeds. Red Lady, is the most favoured variety by farmers for large-scale commercial cultivation in India.



*Photo Courtesy* : Division of Fruits & Horticultural Technology, ICAR-IARI, New Delhi

## STRAWBERRY VARIETY TORREY

### *Fragaria x ananassa*

Introduced from	:	Italy
Native	:	USA
Year of introduction	:	1969
Established at	:	ICAR-NBPGR Regional Station, Shimla
National Identity Number	:	EC57468

Strawberry is a temperate crop. In India it is generally cultivated in the hills. Its main centres of cultivation are Nainital and Dehradun in Uttarakhand, Mahabaleshwar (Maharashtra), Kashmir Valley, Bangalore and Kalimpong (West Bengal). In recent years, strawberry is being cultivated successfully in plains of Maharashtra around Pune, Nashik and Sangali towns. In recent years, strawberry is being cultivated successfully in plains of Maharashtra around Pune, Nashik and Sangali towns. Torrey is a popular variety of strawberry grown in India. The plant bears large-sized, firm, and red flesh strawberries. The sweet-tart flavor of Torrey is the result of 6% of sugar and 0.97% of acid. Torrey strawberries are best for processing but can be relished raw too.



Photo Courtesy : <https://www.gardenexpress.com.au/product/strawberry-torrey>

# TOMATO VARIETY SIOUX

## *Solanum lycopersicum L.*

Introduced from	:	Australia
Native	:	South America
Year of introduction	:	1950
Established at	:	ICAR-IARI, New Delhi; ICAR-IIHR, Bangalore
National Identity Number	:	EC2682

Indeterminate growth habit, fruits round, smooth, medium large, whitish to yellowish green when unripe, attractive red on ripening, less seeded, firm but juicy fruit provide a nice, mild, slightly sweet, classic red-fruit flavor. As an all-purpose variety, it is an excellent choice for fresh slicing or used in salads, as well as for canning, freezing or processing into pastes and sauces. Variety is suitable for growing in the hills, suitable for short distance market. Sioux has been used as a parent in development of many varieties. Pusa Ruby is one of the most popular variety developed by using Sioux x Improved Meeruti.



Photo Courtesy : ICAR- Division of Vegetable Science, IARI, New Delhi

## SPINACH VARIETY VIRGINIA SAVOY

### *Spinacia oleracea* L.

Introduced from	:	USA
Native	:	Central Asia
Year of introduction	:	1973
Established at	:	ICAR-IARI Regional Station, Katrain
National Identity Number	:	106164

Plants upright and vigorous, leaves blistered, crimped, thick and dark green, and late bolting type, 5-6 cuttings can be taken at 15-20days interval. Good yielder over an extended period . In India it is grown in the hills. It is also grown in eastern part of Uttar Pradesh in winter season. It is very nutritive, rich in fibre and vitamins vitamin A and C, folic acid and riboflavin as well as minerals such as iron, calcium and phosphorous. It is useful for constipation and overcoming problem of anaemia. Can be used as a potential crop for diversification of agriculture, environmental sustainability.



Photo Courtesy : ztmbpd.iari.res.in

## ONION VARIETY EARLY GRANO

41

### *Allium cepa* L.

Introduced from	:	USA
Native	:	South West Asia
Year of introduction	:	1953
Established at	:	ICAR-IARI, New Delhi
National Identity Number	:	EC5147

Early Grano sweet onions are a short day variety with good yields of very sweet onions. This softball-sized bulb is straw-colored with white flesh, is excellent fresh or cooked, and has a short to moderate storage life. This variety is disease resistant and should be ready to pick in 110 days.



Photo Courtesy : Division of Vegetable Science, ICAR-IARI, New Delhi

## SWEET PEPPER VARIETY CALIFORNIA WONDER

### *Capsicum annuum* L.

Introduced from	:	USA
Native	:	North and South America
Year of introduction	:	1963
Established at	:	ICAR-IARI, RS Katrain
National Identity Number	:	EC27045

The California Wonder pepper is a very popular vegetable for the home garden because it has a mild, sweet flavour. It grows glossy, deep-green bells about 4” across that turn red at full maturity, which takes about 75 days. This variety grows on upright ever-bearing plants that are 24” tall and resistant to *Tobacco mosaic virus*. It is traditional blocky green sweet pepper which turns red at maturity. Fruits have important nutritional value and phytochemical source necessary for human diet such as carbohydrates, proteins and fats, in addition to significant source of A and C vitamins and phenolic compounds plus minerals like iron, calcium and phosphorous. California Wonder Pepper apart from being a delicious edible also incorporates many health benefits. It is packed with many useful nutrients. It is a good source of vitamin C, folic acid, vitamin B6 and Thiamine and possesses excellent anti-oxidant activity.

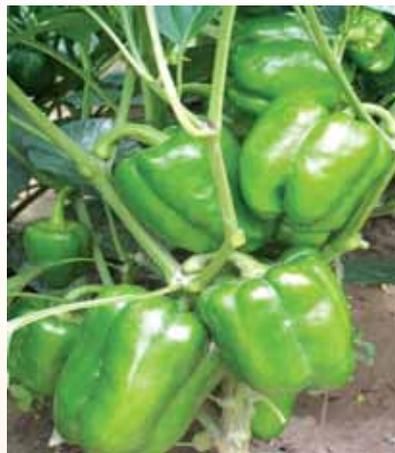


Photo Courtesy : ICAR- IARI RS Katrain

## SWEET PEPPER VARIETY YOLO WONDER

### *Capsicum annuum* L.

Introduced from	:	USA
Native	:	North and South America
Year of introduction	:	1962
Established at	:	ICAR-IARI, RS Katrain
National Identity Number	:	EC22346

Chilli var. Yolo Wonder is the sweetest of all bell peppers and have a mild and a fruity-tangy taste. An excellent source of antioxidants specially carotenoids, red bell peppers have twice the amount of Vitamin C than the green capsicum.. Also rich in Vitamin E, Vitamin B, minerals like manganese, and other anti-inflammatory nutrients they possess potential anti-cancer benefits. Extremely heat sensitive.



Photo Courtesy: ICAR- IARI RS Katrain

## CARROT VARIETY NANTES

### *Daucus carota* L.

Introduced from	:	UK
Native	:	Europe and Asia
Year of introduction	:	1956
Established at	:	ICAR-IARI, RS Katrain
National Identity Number	:	EC008605

Nantes carrots are shorter, averaging 15 centimetres in length and have blunt and rounded ends with a beautiful orange colour. This carrot variety is crunchy, mildly sweet and excellent to be consume raw. Its name is based on the French city of Nantes and is the preferred carrot of choice for carrot cake. Consumers prefer Nantes carrot because of its shining deep orange colour, sweet taste, marketability and short maturity period. Most popular variety grown in India.



Photo Courtesy : ICAR- IARI RS Katrain

## CARROT VARIETY SCARLET NANTES CORELESS

### *Daucus carota* L.

Introduced from	:	USA
Native	:	Europe and Asia
Year of introduction	:	1968
Established at	:	ICAR-IARI, RS Katrain
National Identity Number	:	EC050391

Scarlet Nantes is a standard Nantes type for main season production with good orange colour and flavour. Roots are fairly smooth with a Cylindro-conical shape and blunt tip. Scarlet Nantes is a widely adapted, versatile variety having young, mature and slightly larger Nantes type carrots for processing. Field holding ability is good and the variety is very slow to bolt. Yield potential is high. Scarlet Nantes is used for the pre-pack, fresh market, home garden and processing markets with the possibility of use as a baby carrot.



Photo Courtesy : ICAR- IARI RS Katrain

## RADISH VARIETY WHITE ICICLE

### *Raphanus sativus* L.

Introduced from	:	UK
Native	:	Mediterranean region
Year of introduction	:	1956
Established at	:	ICAR-IARI, Regional Station Katrain
National Identity Number	:	EC9409

Radish ‘White Icicle’ is a open-pollinated uniform strain which forms cylindrical long pure snow-white roots. It is fast-growing and produces uniformly-sized radishes growing to around 15cm long, in shape of an icicle. The white flesh is crisp and mild and less pungent than that of the round varieties, they have a spice that warms the tongue, but doesn’t bite back. It is heirloom variety.



Photo Courtesy : ICAR- IARI RS, Katrain

## RADISH VARIETY SCARLET GLOBE

### *Raphanus sativus* L.

Introduced from	:	UK
Native	:	Mediterranean region
Year of introduction	:	1971
Established at	:	ICAR-IARI, RS Katrain
National Identity Number	:	EC094662

Radish ‘Scarlet Globe’ is a very popular and easy growing variety. Having one inch globes, produce bright red skin, evenly shaped roots with pure white, crisp, moist flesh and mild flavour. This is quick growing summer season crop in temperate climate and is suitable for earlier sowings under glass as well as outdoors. It is rich in Vitamin C, Vitamin E, Vitamin A, Vitamin B6, and Vitamin K and carry a high amount of antioxidants, folic acid and flavonoids alike along with fiber, zinc, potassium, phosphorus, magnesium, copper, calcium, iron, and manganese.



Photo Courtesy : <https://www.seedsavers.org/>

## CABBAGE VARIETY GOLDEN ACRE

### *Brassica oleracea var. capitata L.*

Introduced from	:	Denmark
Native	:	Europe
Year of introduction	:	1956
Established at	:	ICAR-IARI, Regional Station Katrain
National Identity Number	:	EC8774

Golden acre cabbage is an excellent variety suitable for early summer. It is a slow bolting ball head variety that produces huge heads weighing about 3-4 kgs. It has succulent, sweet and tender leaves with excellent flavour. Golden Acre cabbage produces round, medium-sized tight heads shaped like balls having few outer leaves.



Photo Courtesy :ICAR-IARI RS Katrain

## KNOL KHOL VARIETY WHITE VIENNA

*Brassica oleracea* var. *gongylodes* L.

Introduced from	:	Japan
Native	:	Europe
Year of introduction	:	1956
Established at	:	ICAR-IARI, Regional Station Katrain
National Identity Number	:	EC10161

Knolkhol or Kohlrabi, also known as German turnip, is a cruciferous vegetable. Despite its secondary name, kohlrabi is not a root vegetable and does not belong to the turnip family. Instead, it belongs to the Brassica, or mustard family and is related to cabbage, broccoli, and cauliflower. Leaves and turnip like stem are used as vegetable in northern parts of India.



Photo Courtesy: IARI RS Katrain and Division of Vegetable Science IARI New Delhi

## TURNIP VARIETY PURPLE TOP WHITE GLOBE

### *Brassica rapa var. rapa L.*

Introduced from	:	UK
Native	:	Middle and East Asia
Year of introduction	:	1996
Established at	:	ICAR-IARI, Regional Station Katrain
National Identity Number	:	EC389757

Purple Top White Globe turnip is the most popular and widely grown variety worldwide. The tops of this versatile vegetable can be cooked as greens, and its edible roots are good for storing, canning, and freezing. The flesh is sweet, mild, and fine-grained. The part of the tuber that grows below ground is white, while the upper part that sticks out of the ground is purple. The greens, which are also edible, grow from the purple part. Purple tops grow larger than many varieties of turnip, and they can be stored successfully in a cool, moist location.



Photo Courtesy : ICAR-IARI RS, Katrain

## PEA VARIETY METEOR

### *Pisum sativum* L.

Introduced from	:	UK
Native	:	Western Asia and North Africa
Year of introduction	:	1971
Established at	:	ICAR-IIVR, Varanasi & ICAR-IIHR, Bangalore
National Identity Number	:	EC96633

Pea variety ‘Meteor’ is a half-hardy climbing annual that produces green pods containing round green peas that can be eaten straight from the plant or added to various cooked dishes. It has a high Vitamin A, K and fibre content. With a neat, dwarfing habit and excellent winter hardiness, Pea ‘Meteor’ is ideal for growing in the garden and exposed areas, as an October - November sown crop. This superb first early, round seeded variety produces an abundance of small, but well filled pods. A superb pea for first harvest of the season, and with a better flavour.



Photo Courtesy : <https://www.simplyseed.co.uk/>

## PEA VARIETY ARKEL

### *Pisum sativum* L.

Introduced from	:	France
Native	:	Western Asia and North Africa
Year of introduction	:	1964
Established at	:	ICAR-NBPGR, New Delhi; ICAR-IIHR, Bangalore
National Identity Number	:	EC28061

It is an early, wrinkled seeded and most popular exotic variety which is widely grown. Plant is dwarf but the growth is vigorous and may grow upto 45 cm. Pods are dark green, 8.5 cm long, incurved towards the sutures and pointed distal end with 8-10 well filled, wrinkled seeds. It is suitable for both fresh market and dehydration. It takes 60-65 days for first picking. Green pod yield 8-10 t/ha.



Photo Courtesy : Dept.Uttaranchal (P.G.) College of Bio-Medical Sciences & Hospital Uttaranchal College of Education

## CUCUMBER VARIETY POINSETTE

### *Cucumis sativus* L.

Introduced from	:	USA
Native	:	South Asia
Year of introduction	:	1970
Established at	:	ICAR-IARI, New Delhi
National Identity Number	:	EC093231

It is an annual, monoecious, trailing-vine, flesh is sweet, with or without a musky aroma. Poinsett are straight, dark green, non-bitter and delightfully crisp cucumbers, is one of the best open-pollinated, classic slicing cucumbers. Very popular with its overall vigor, productivity and disease resistance. Resistant to many common diseases that plague cucumber plants, including powdery & downy mildew, anthracnose, angular leaf spot, and scab.



Photo Courtesy : Cucumber- Poinsett seeds | The Seed Collection

## FRENCH BEAN VARIETY KENTUCKY WONDER

### *Phaseolus vulgaris* L.

Introduced from	:	USA
Native	:	Central and South America
Year of introduction	:	1955
Established at	:	ICAR-NBPGR Regional Station, Shimla
National Identity Number	:	EC6884

French bean is one of the most important leguminous vegetable crops of North eastern region. Its tender pods are used as a green vegetable while shelled green beans and dry beans for preparation of special dishes. It is a short duration crop and farmers get more profit in a short period. Highly nutritious containing about 23.0% of Protein, 1.3% Fat, 60.6% Carbohydrates and some minerals like Calcium, Magnesium, Phosphorous and Iron. In India it is cultivated in Himachal Pradesh, Jammu and Kashmir, Uttar Pradesh, Maharashtra Karnataka and Andhra Pradesh. The Kentucky Wonder is an heirloom pole bean plant with high yields and a dark green color, easy to grow in all parts of the country. Previous nicknames include “Old Homestead” and “Texas Pole”.

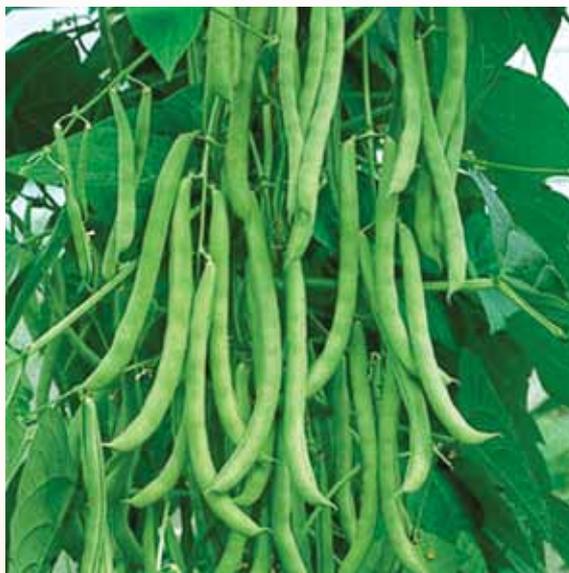


Photo Courtesy : <https://www.ufseeds.com/>

## WATER MELON VARIETY SUGAR BABY

### *Citrullus lanatus* (Thunb.) Matsum. & Nakai

Introduced from	:	USA
Native	:	Africa
Year of introduction	:	1967
Established at	:	ICAR-IARI, New Delhi
National Identity Number	:	EC39417

As its name implies, Sugar Baby watermelons rank as one of the sweetest cultivars. The fruit is slightly small in size, round in shape having bluish black rind and deep pink flesh with small seeds. TSS 11-13%; average weight 3-5 kg. The fruits ripen in 85 days. Melons are round “picnic” or “icebox” watermelons perfect for small families and as the name suggests, small enough to fit into the icebox. They have either a dark green with slight dark veins or medium green with dark veined rind. The flesh is sweet, red, firm, and crisp mottled with very few small, tan-black seeds.



Photo Courtesy : ICAR- Division of Vegetable Science, IARI New Delhi

## GROUNDNUT VARIETY EARLY RUNNER

### *Arachis hypogaea* L.

Introduced from	:	USA
Native	:	South America
Year of introduction	:	1969
Established at	:	ICAR- DGR, Junagadh
National Identity Number	:	EC66138

Some of the direct introductions released as varieties in India are Ah-32, Ah-334 (in Gujarat), 'Big Japan' and 'Early Runner' (in Bihar) and UF-70-103 (in Maharashtra). Although, the introduced genotypes, 'Asiriya Mwitunde' from Tanzania, 'Acholi White' from Uganda and 'Shulamit' from Israel were not released as varieties, they have been used as parents in hybridisation programme. BG-3 (Birs Groundnut-3) was released in 1986, developed by crossing Early Runner x Asiriya Mwitunde by BAU, Kanke by mass selection. BG-3 is early maturing and drought tolerant, oil content 49%. Since 1940, there has been a shift to production of Runner group peanuts. This shift is due to good flavor, better roasting characteristics and higher yields when compared to Spanish types leading to food manufacturers' preference for use in peanut butter and salting. Cultivars of Runners include 'Southeastern Runner 56-15', 'Dixie Runner', 'Early Runner', 'Virginia Bunch 67', 'Bradford Runner', 'Egyptian Giant' (also known as 'Virginia Bunch' and 'Giant'), 'Rhodesian Spanish Bunch' (Valencia and Virginia Bunch), 'North Carolina Runner 56-15', 'Florunner', and 'Shulamit'.



Photo Courtesy : DGR, Junagadh

## SOYBEAN VARIETY LEE

### *Glycine max* L.

Introduced from	:	USA
Native	:	China
Year of introduction	:	1960
Established at	:	ICAR-IISR, Indore
National Identity Number	:	EC16695

Lee variety was notified in 1975, for Northern hill zone. The variety has purple flowers, tawny pubescence, yellow seed coat, black hilum, light brown pods and determinate. . In Asian countries, soybeans have been used mostly as a source of food, and in Western countries, they have been used as animal feed and in non-food products. However, since scientific evidence of the dietary benefits of soybeans has been published, the use of soybeans as a food ingredient has increased. In Asia, soybeans have been used in various ways on their own and also combined with fermented products to be used as seasonings or side dishes. Lee is the landmark soybean USDA cultivar. Two other varieties being Bragg and improved Pelican which are also maintained.



Photo Courtesy : Kisan helpline

## CASTOR VARIETY MAUTHNERS DWARF

### *Ricinus communis* L.

Introduced from	:	Australia
Native	:	East Africa
Year of introduction	:	1964
Established at	:	ICAR-IIOR, Hyderabad
National Identity Number	:	EC29079

Variety 48-1 (Jwala) was released in 2007 with Mauthners dwarf as one of the parent (High Oil Mutant x Mauthner's Dwarf). The variety was released for all castor growing regions of India and is resistant to Fusarium wilt, tolerant to Botrytis, saline and drought conditions.



Photo Courtesy: IIOR, Hyderabad

## WHEAT VARIETY SONALIKA

### *Triticum aestvum* L.

Introduced from	:	CIMMYT, Mexico
Native	:	Western Asia and northern Africa
Year of introduction	:	1968
Established at	:	ICAR- IARI, New Delhi
National Identity Number	:	EC54449

The landmark varieties like Sonalika, Kalyansona, VL Gehun 616 dominated wheat areas for simple reasons of wider adaptability, high yield potential, disease resistance, grain quality, appropriate maturity duration, plant height, and other desirable agronomic traits. Further, some the varieties like CPAN 1796 and CPAN 1922 were specifically developed to provide genetic diversity for rust resistance at the foci of rust perpetuation and spread (the northern hills). This strategy was successful in reducing the spread of rust on the wheat crop in plains. Particularly, Sonalika is still being cultivated in some parts of the higher hills due to its adaptation under late sowing and rainfed situations . VL Gehun 616, a facultative wheat variety derived from a cross of Sonlaika and CPAN 1507 was found promising and released in 1986 as the first facultative wheat variety for cultivation under early sown rainfed condition in NHZ. It has high resistance and wider adaptability and still the most popular variety among the farmers.



Photo Courtesy : BISA Farm, 2017; ICAR-IARI, New Delhi

## RICE VARIETY

(IR8-36-Peta x Dee Geo Weo Gen)

### *Oryza sativa* L.

Introduced from	:	IRRI, Philippines
Native	:	South East Asia
Year of introduction	:	1965
Established at	:	ICAR-IARI, New Delhi; ICAR-NBPGR, New Delhi
National Identity Number	:	EC32695

IR8 is a high-yielding semi-dwarf rice variety developed by the International Rice Research Institute (IRRI) in the early 1960s. Promoters such as the IRRI and farmer benefactors of IR8 have called it ‘miracle rice’, and celebrate it for fighting famine. IR8 dramatically increased the yields of Asian rice from 1 or 2 ton per hectare to 4 or 5 tons per hectare. It played a significant part in the Green Revolution. IR8 was the eighth of 38 crossbred rice varieties in a 1962 experiment by IRRI. It was a cross of Peta, a high yield rice variety from Indonesia, and Dee-geo-woo-gen (DGWG), a dwarf variety from China. IR8 was well suited to the places it was first introduced and is termed as rice variety for the ages.



Photo Courtesy : [http://books.irri.org/RT\\_Supplement-IR8.pdf](http://books.irri.org/RT_Supplement-IR8.pdf)

## BARLEY VARIETY CLIPPER

### *Hordeum vulgare L.*

Introduced from	:	Australia
Native	:	Asia and Near East
Year of introduction	:	1970
Established at	:	ICAR-IARI, New Delhi
National Identity Number	:	EC93082

Clipper was the dominant barley variety for around 20 years at University of Adelaide. The Heritage variety is two rowed is especially suitable for malt production and brewing. It matures in about 135-140 days. It has yield potential of 28-30 quintals of grains per hectare under good management.



Photo Courtesy : Barossa Valley Craft Malt

## FABA BEAN VARIETY HFB-2

### *Vicia faba* L.

Introduced from	:	Syria
Native	:	Asia Minor and Mediterranean region
Year of introduction	:	1988
Established at	:	AICRN Potential Crops, NBPGR, New Delhi
National Identity Number	:	EC 243588

Faba bean var. HFB-2 is suitable for cultivation during the Rabi season in the plains zone (Haryana, Punjab, Uttar Pradesh and Chhattisgarh). The Faba bean variety HFB-2 has distinct superiority in seed yield over the existing varieties.



Photo Courtesy: AICRN Potential Crops, ICAR-NBPGR, New Delhi

# GERBERA

## *Gerbera jamesonii* Bolus ex Hook.f.

Introduced from	:	Australia
Native	:	South East Africa
Year of introduction	:	1955
Established at	:	ICAR-IIHR, Bangalore
National Identity Number	:	EC8225

Gerberas are one of the top ten most popular commercial cut flowers in the world. Gerbera flower stalks are long, thin, and leafy and have a long vase life. In India gerbera has become one of the high return cut flower crops. The major producing states in India are Madhya Pradesh, Gujarat, Assam, Maharashtra, West Bengal, Himachal Pradesh, Uttarakhand. Postharvest-life of gerbera varies from 1-4 weeks after harvest, depending on varietal, harvesting techniques, and postharvest management. A number of exotic varieties such as Dusty, Shania, Salvatore, Tamara, Fredorella, Vesta & Red Impulse, Supernova, Nadja, Doni, Mammut, Uranus, Fredking, Fullmoon, Talasa & Panama, Kozak, Carrera, Goliath, Rosalin & Salvatore are grown in India.

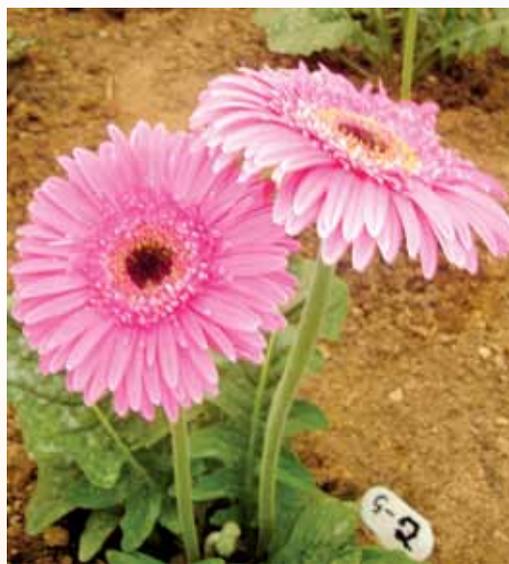


Photo Courtesy: Germplasm Exchange and Policy Unit, ICAR-NBPGR, New Delhi

## GLADIOLUS VARIETY SNOW PRINCESS

### *Gladiolus* spp

Introduced from	:	Netherlands
Native	:	South Africa
Year of introduction	:	1965
Established at	:	ICAR-IARI, New Delhi; ICAR-IIHR, Bangalore
National Identity Number	:	EC32627

Gladiolus are grown for their elegant flowers that bloom on spikes. Large number of exotic varieties were introduced from Holland which revolutionized gladiolus cultivation in the country. Gladiolus has become the most popular cut flower grown successfully under open field conditions. The major gladiolus producing states in the country are Uttar Pradesh, West Bengal, Odisha, Chhattisgarh, Haryana & Maharashtra. The cultivar ‘Snow Princess’ blooms in green buds with white florets on a very strong spike. The elegant long spikes with beautifully arranged florets looks very attractive. The variety gets ready in 80-90 days. It has 11-14 florets per spike and spike length is 60-70 cm.



Photo Courtesy: Germplasm Exchange and Policy Unit, ICAR-NBPGR, New Delhi

## ROSE VARIETY FIRST RED

### *Rosa hybrida*

Introduced from	:	Israel
Native	:	Asia
Year of introduction	:	1999
Established at	:	IARI, New Delhi; IIHR, Bangalore; DFR, Pune
National Identity Number	:	EC448151

First Red is the most popular variety of roses grown for cut flower production in India. The flowers come well under protected condition. Flowers are deep red in colour with long stem. The cut stem is around 70 cm long. It can bear around 130 flowers per m<sup>2</sup>/year. It has a good vase-life may be 10 days. India has good favourable climatic conditions for production of flowers for trade in winter (October-March) when the demand in Europe is very high. In India, West Bengal, Karnataka, Gujarat, Chhattisgarh, Maharashtra, Uttar Pradesh, Tamil Nadu, Madhya Pradesh, Andhra Pradesh and Orissa are the states having major production of cut roses.

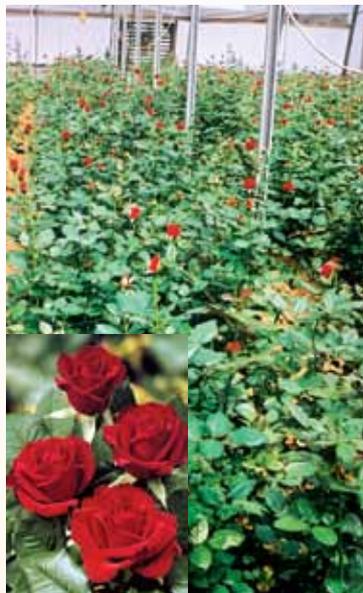


Photo Courtesy: Centre for Protected Cultivation Technology, ICAR-IARI, New Delhi

## WILD GRAPE VARIETY DOGRIDGE

### *Vitis x champinii* Planch.

Introduced from	:	USA
Native	:	USA
Year of introduction	:	1989
Established at	:	ICAR-NRC Grapes; ICAR-IIHR, Bangalore & ICAR-IARI, New Delhi
National Identity Number	:	EC281100

In India, Dogridge has been identified as the best rootstock for drought and salinity resistance in table grape varieties. It has become very popular in Maharashtra, Andhra Pradesh and Northern Karnataka. The use of rootstocks like Dogridge helps in mitigating the twin problems of salinity and drought. In addition, Dogridge can also take care of nematodes in the soil, simultaneously providing excellent nutritional support to the grafted scion.



Photo Courtesy : Division of Fruits & Horticultural Technology, ICAR-IARI, New Delhi

## BANANA WILD SPECIES

67

### *Musa jackeyi* W. Hill, *Musa textilis* Nee

Introduced from	:	Belgium
Native	:	South Asia
Year of introduction	:	2018
Established at	:	ICAR-NRC Grapes; ICAR-NRC Banana, Trichy; ICAR-NBPGR, New Delhi
National Identity Number	:	EC949666 & EC649665

*Musa jackeyi* is a type of banana tree having tall, dark trunk with red sap. It rarely suckers. Flowers arise from the top of the trunk, with the male flowers at the base and the female flowers at the upper end. The fruit are crowded in 2 rows and are orange-red when ripe. The fruits are short, horizontal, egg-shaped and have numerous seeds buried in the pulp. It is distinguishable from all other species of *Musa* by the red sap and erect inflorescence. *Musa textilis*, is a species of banana native to the Philippines, grown as a commercial crop in the Philippines, Ecuador, and Costa Rica. This is commonly known as Manila hemp. It has great economic importance as Manila hemp is extracted from the leaf-stems. The fiber was originally used for making twines and ropes; but now used in a variety of specialized paper products including tea bags, filter paper and banknotes. It is classified as a hard fiber, along with coir, henequin and sisal.



Photo Courtesy TCCU, ICAR-NBPGR, New Delhi

## EUROPEAN CRAB APPLE

### *Malus sylvestris* (L.) Mill.

Introduced from	:	USA
Native	:	North America and Asia
Year of introduction	:	1987
Established at	:	ICAR-NBPGR Regional Station, Shimla
National Identity Number	:	EC202706

They are widely grown for their attractive growth habit, spring flower display, and decorative fruits. The fruits are much smaller and more tart than the common apple (*Malus domestica*) but are suitable for jellies, preserves, and cider. The species is one of the ancestors of the cultivated apple (of which there are more than 6,000 varieties), it can live to up to 100 years.



Photo Courtesy : ICAR-NBPGR RS Shimla

## PINEAPPLE PAPAYA OR MOUNTAIN PAPAYA

*Vasconcellea goudotiana, Vasconcellea pubescens, Vasconcellea parviflora, Vasconcellea quercifolia, Vasconcellea stipulate, Vasconcellea monoica*

Introduced from	:	USA
Native	:	Tropical South America
Year of introduction	:	2019
Established at	:	ICAR-IARI, New Delhi
National Identity Number	:	EC993392-993396

*Vasconcellea* is an evergreen shrub or small tree with an average height of ca. 5 metres (16 ft) and can grow up to 10 metres (33 ft) tall. The fruits are arranged spirally along the trunk and a single tree can produce 50-60 fruits per year. The fruit pulp is edible, similar to papaya and is usually cooked as a vegetable. It is also eaten raw. Species are being utilised in the hybridization programme of the papaya improvement.



Photo Courtesy : Division of Fruits and Horticultural Technology, ICAR-IARI, New Delhi

## WILD BOTTLE GOURD

### *Lagenaria sphaerica* (Sond.) Naudin

Introduced from	:	USA
Native	:	Africa
Year of introduction	:	2021
Established at	:	ICAR-IARI, New Delhi
National Identity Number	:	EC1085260

*Lagenaria sphaerica* is a close relative of the calabash/bottle gourd and bears large, white, fragrant flowers which open in the evening, and unique mottled green fruit the size of a cricket ball. The plant is harvested from the wild for local use as a food, medicine and source of materials. Mature fruits are sold for medicinal use in local markets in South Africa. The plant is grown as an ornamental in gardens. Young fruits - cooked and eaten as a vegetable. Mature fruits are poisonous, bitter- and release strong-smelling volatile compounds. The Kamba of Kenya use the fruits as a poison for cockroaches and rats. The plant can flower all year round. Hybrids between *Lagenaria sphaerica* and *Lagenaria siceraria* are found in cultivation in eastern Africa. However, the hybrid is sterile: female flowers abort and male flowers have poor pollen viability. The possibility of transfer of desirable traits to *Lagenaria siceraria* still requires investigation.



Photo Courtesy : Division of Vegetable Science, ICAR-IARI, New Delhi

## WILD TOMATO

### *Solanum peruvianum* L. *Solanum pimpinellifolium* L.

Introduced from	:	United Kingdom
Native	:	South America
Year of introduction	:	1948
Established at	:	ICAR-NBPGR, New Delhi
National Identity Number	:	EC493-494, EC484

*Solanum peruvianum* is a wild tomato relative from South America (mainly northern Chile to central Peru). It is not a domesticated species. *Solanum pimpinellifolium*, commonly known as the currant tomato or pimp, is a wild species of tomato native to Ecuador and Peru but naturalized elsewhere. Its small fruits are edible, and it is commonly grown in gardens as an heirloom tomato. *Solanum pimpinellifolium* is important in tomato breeding as it will hybridize with common domestic tomatoes. Its relatedness to tomatoes and ability to freely cross with them has allowed it to be used for the introduction of disease resistance traits in tomato varieties, as well as in the study of the genetic control of tomato traits such as fruit shape and size. Considered the ancestor of domesticated tomatoes, it is valued for supplementing the limited gene pool of the domestic tomato.



Photo Courtesy : Germplasm Exchange and Policy Unit, ICAR-NBPGR, New Delhi

72

## WILD CHILLI

### *Capsicum chinense* Jacq.

Introduced from	:	USA
Native	:	North and South America
Year of introduction	:	1956
Established at	:	ICAR-NBPGR, New Delhi
National Identity Number	:	EC9281

*Capsicum chinense*, commonly known as a “habanero-type pepper”, is a species of chili pepper native to the Americas. Fruits are well known for their unique flavors and many have exceptional heat. The hottest peppers in the world are members of this species, with Scoville Heat Unit scores of over 2 million. The two species can also hybridize and generate inter-specific hybrids. It is believed that *C. frutescens* is the ancestor to the *C. chinense* species.



Photo Courtesy : Division of Germplasm Evaluation, ICAR-NBPGR, , New Delhi

## WILD GRASSPEA

*Lathyrus* spp. (*L. aphaca*, *L. annuus*, *L. cassius*, *L. cicera*, *L. chloranthus*, *L. cirrhosis*, *L. amphicarpos*, *L. clymenum*, *L. gorgoni*, *L. hirsutus*, *L. hierosolymitanus*, *L. inconspicuus*, *L. latifolius*, *L. ochrus*, *L. odoratus*, *L. nissolia*, *L. pratensis*, *L. rotundifolius*, *L. setifolius*, *L. sphaericus*, *L. sylvestris*, *L. tingitanus*, *L. tuberosus*, *L. nissolia*, *L. vinealis*)

Introduced from	: Spain, Hungary & USA
Native	: Eurasia and Africa
Year of introduction	: 2020
Established at	: ICAR-NBPGR, New Delhi
National Identity Number	: EC1061207-1061230, EC1068321-341, EC1073130-149, 153-155, 159-172, 176-191

Grasspea is a hardy crop, able to withstand extreme environmental conditions such as drought, floods and poor soils. For this reason, it is sometimes considered a famine food, eaten when other crops have failed. Wild genetic resources of the species offer scope to develop introgression lines for their use in grass pea breeding. The resistant accessions are included in the crossing block to strengthen pre-breeding efforts in grass pea. The wild species/ relatives were procured from different sources many of them were introduced first time.



Photo Courtesy: Division of Germplasm Evaluation, ICAR-NBPGR, New Delhi

## WILD MAIZE

*Zea parviglumis; Zea diploperennis; Zea mexicana, Tripsacum*

Introduced from	:	USA & Mexico
Native	:	Philippines
Year of introduction	:	2021
Established at	:	ICAR-NBPGR, New Delhi
National Identity Number	:	EC1084237-269, EC941076-77; EC1074701-743; EC930577-78

Virtually all populations of this teosinte are either threatened or endangered: *Z. diploperennis* exists in an area of only a few square miles. Currently, a large amount of scientific interest exists in conferring beneficial teosinte traits, such as insect resistance, perennials, and flood tolerance, to cultivated maize lines, although this is very difficult due to linked deleterious teosinte traits. The species are augmented to assess their strengths and weaknesses in studying the origins and early dispersals of maize. The species were not represented in National Genebank hence were augmented for use by researchers in the country.



Photo Courtesy : Division of Germplasm Conservation, ICAR-NBPGR, New Delhi

## WILD COTTON

### *Gossypium ekmanianum* Wittmack

Introduced from	:	USA
Native	:	Dominican Republic
Year of introduction	:	2017
Established at	:	PAU Ludhiana
National Identity Number	:	EC906581-89

Understanding the relationship between domesticated crop species and their wild relatives is paramount to germplasm maintenance and the utilization of wild relatives in breeding programs. Recently, *Gossypium ekmanianum* was resurrected as an independent species based on morphological analysis of specimens obtained from the Dominican Republic, where the original type specimen was collected. The molecular data support the recognition of *G. ekmanianum* as a distinct species that is phylogenetically close to *G. hirsutum* a germplasm collection maintained for diversity preservation and future breeding resources (Genetic Resources and Crop Evolution 62 (1);DOI10.1007/S/0722-014-0138-X).



Photo Courtesy : PAU, Ludhiana and <http://apps.kew.org>

## ACKNOWLEDGEMENTS

The authors would like to express their gratitude to the Former Director(s) and all staff and former staff of Germplasm Exchange and Policy Unit at ICAR-NBPGR and its partner institutions for their contributions towards introducing and maintaining unique introductions in plant genetic resources, and for providing the information and photographs. The authors also thank all the scientists and experts who directly or indirectly contributed in providing any type of information for compilation of this publication. However, special thanks are extended to the following list of experts in alphabetical order:

1. Dr AD Munshi, Principal Scientist, Division of Vegetable Science, ICAR-IARI, New Delhi
2. Dr Anil Khar, Principal Scientist, Division of Vegetable Science, ICAR-IARI, New Delhi
3. Dr Anuradha Agrawal, National Coordinator, NAHEP, New Delhi
4. Dr Chander Prakash, Head, ICAR-IARI Regional Station, Katrain
5. Dr Dharmendra Pathak, Principal Cotton Breeder, PAU, Ludhiana
6. Dr Hanuman Lal, Nodal Officer AICRN PC, ICAR-NBPGR, New Delhi
7. Dr J K Ranjan, Principal Scientist, Division of Vegetable Science, ICAR-IARI, New Delhi
8. Dr Jai Prakash, Principal Scientist, Division of Fruits and Horticultural Technology, ICAR-IARI, New Delhi
9. Dr Jakir Hussain, Principal Scientist, Division of Vegetable Science, ICAR-IARI, New Delhi
10. Dr Julius Uchoi, Officer Incharge, ICAR-NBPGR Regional Station, Shillong
11. Dr K M Rai, Principal Scientist, ICAR- NBPGR Regional Station, Bhowali
12. Dr Kuldeep Tripathi, Senior Scientist, ICAR-NBPGR, New Delhi
13. Dr Mam Chand Singh, Principle Scientist, Centre for Protected Cultivation Technology, ICAR-IARI, New Delhi
14. Dr M Latha, Officer Incharge, ICAR-NBPGR Regional Station, Thrissur
15. Dr Mohar Singh, Officer Incharge, ICAR-NBPGR Regional Station, Shimla

16. Dr Narender Negi, Principal Scientist, ICAR-NBPGR Regional Station, Shimla
17. Dr PK Singh, Principal Scientist, Centre for Protected Cultivation ICAR-IARI, New Delhi
18. Dr Probir Kumar Pal, Principal Scientist, CSIR-IHBT, Palampur
19. Dr Ravi Mathur, Director, ICAR-IIOPR, Eluru
20. Dr RL Mishra, Former Project Coordinator, AICRP on Floriculture, ICAR-IARI, New Delhi
21. Dr Sandhya Gupta, Officer Incharge, ICAR-NBPGR New Delhi
22. Dr Sanjay Kumar, Director, CSIR-IHBT, Palampur
23. Dr Sanjay Kumar Singh, Head, Division of Fruits and Horticultural Technology, ICAR- IARI, New Delhi
24. Dr Sheikh M Sultan, Officer Incharge, ICAR-NBPGR Regional Station, Shimla
25. Dr Sherry R Jacob, Senior Scientist, Division of Germplasm Conservation, ICAR-NBPGR, New Delhi
26. Dr Sunil Archak, Officer Incharge, Agriculture Knowledge and Management Unit, ICAR-NBPGR, New Delhi
27. Dr Vartika Srivastava, ICAR-NBPGR New Delhi
28. Dr Vijay Singh Meena, Officer Incharge, ICAR-NBPGR Regional Station, Jodhpur
29. Dr Vinay Bhardwaj, Principal Scientist, CPRI, Shimla
30. Dr VK Sharma, Senior Scientist, Division of Germplasm Evaluation, ICAR-NBPGR, New Delhi

## ACRONYMS

1. AICRP-All India Coordinated Research Project
2. AICRN PC- All India Coordinated Research Network on Potential crops
3. CIAH- Central Institute of Arid Horticulture
4. CIARI- Central Island Agricultural Research Institute
5. CICR- Central Institute of Cotton Research
6. CPCT-Centre for Protected Cultivation Technology
7. CPRI- Central Potato Research Institute
8. CSIR- Council of Scientific and Industrial Research
9. DFR- Directorate of Floricultural Research
10. DGR- Directorate of Groundnut Research
11. EC- Exotic Collection
12. IARI- Indian Agricultural Research Institute
13. IARI RS- Indian Agricultural Research Institute Regional Station
14. ICAR- Indian Council of Agricultural Research
15. IGFRI- Indian Grassland and Forage Research Institute
16. IHBT- Institute of Himalayan Biotechnology
17. IIHR- Indian Institute of Horticultural Research
18. IOPR- Indian Institute of Oilpalm Research
19. IIOR- Indian Institute of Oil Research
20. IISR- Indian Institute of Soybean Research
21. IIVR- Indian Institute of Vegetable Research
22. NBPGR- National Bureau of Plant Genetic Resources
23. NBPGR RS - National Bureau of Plant Genetic Resources Regional Station
24. NIASM- National Institute of Abiotic Stress Management
25. NRCB - National Research Centre for Banana
26. NRCG- National Research Centre for Grapes
27. PAU- Punjab Agricultural University









ICAR-National Bureau of Plant Genetic Resources (NBPGR) is the nodal organization in India to carry out research, education and service activities in managing plant genetic resources. NBPGR houses the national genebank that is conserving more than 400,000 accessions belonging to various crops.

Its headquarters is located in New Delhi with ten regional stations spread across the country. NBPGR is a constituent organization under the Indian Council of Agricultural Research.



## **ICAR-National Bureau of Plant Genetic Resources**

Pusa Campus, New Delhi 110 012, India  
[www.nbpgr.ernet.in](http://www.nbpgr.ernet.in)

