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## Collection of Plant Genetic Resources from Parts of Arid and Semi-Arid Regions in India

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Between 1980 to May 2001, 68 major explorations comprising 48 crop/region specific and 20 multicrops, were carried besides 13 minor ones in the states – Gujarat, Haryana, Rajasthan and adjoining areas of Madhya Pradesh, Punjab and Uttar Pradesh (Chandel and Bhandari, 1989; Chopra and Bhandari, 1989; Dwivedi and Bhandari, 1995, 1996, 1999; Dwivedi *et al.*, 1994, 1997, 1998). Of these collection trips, 25 major explorations were jointly carried out with National/International Institutes

(Central Arid Zone Research Institute, Jodhpur; Central Institute for Jute and Allied Fibres, Barrackpore, W.B.; CCS Haryana Agricultural University, Hisar and its Agricultural Research Station, Bawal, Directorate of Pulse Research, Kanpur; ISCRISAT, Hyderabad; University of Hyderabad; Indian Institute of Horticulture Research, Bangalore; Gujarat Agricultural University, Main Rice Research Station Navagaon; Kheda, Wheat Research Station Vijapur, Mehsana; National Research Centre for Arid Horticulture, Bikaner and Rajasthan Agriculture University, Agriculture College, Jobner. Six

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crop specific explorations were undertaken for the collection of sesame, okra and eggplant under NBPGR/IPGRI Collaboration Programme from parts of Gujarat and Rajasthan. The sample were collected from farmers' field, threshing yards, farm store, kitchen gardens, weekly village market (cultivated form), waste lands, roadside, irrigated and rainfed farmers' fields, river banks, canal areas, annual and ephemeral ponds, terraces, slopes, valley and hilltops. Biased, random and bulk sampling procedures were followed for collecting of germplasm. Herbarium sheets were prepared. Passport data were recorded along with important plant characters. One set of collected seed material was sent to NBPGR Headquarter, New Delhi for conservation in National Genebank and getting accession numbers. Vegetative propagules were planted at this Regional Station for establishment.

A total of 12,884 collections comprising cultivated (12,365) and wild (519) accessions have been made (Tables 1 and 2) in various crops/economically important/rare plant group like cereals and millets (1,823), pulses and legumes (5,484), oilseeds (1,829), fibres (385), vegetables (1,464), fruits and minor fruits (905), medicinal and aromatic plants (117), halophytes (22), spices and condiments (167), fodder plants (153) wild relative and weedy forms (339) and miscellaneous (223) (Tables 1 and 2); (Dwivedi and Bhandari, 1996; Dwivedi *et al.*, 1998). An effort was made to collect maximum

**Table 1. Explorations undertaken and germplasm collected during 1980-May, 2001**

Year	Explorations undertaken			Samples Collected	
	Major	Minor	Cultivated	Wild	Total
1980	1	-	2,764	33	2,797
1981	1	-	1,547	29	1,576
1982	-	1	356	-	356
1983	1	-	176	2	178
1984	-	1	60	0	60
1985	1	-	1,018	5	1,023
1986	6	7	1,078	6	1,084
1987	5	2	550	3	553
1988	7	-	608	1	609
1989-90	8	-	1,226	2	1,228
1990-91	4	-	568	139	707
1991-92	4	-	448	20	468
1992-93	6	-	486	13	499
1993-94	1	-	96	1	97
1995-96	4	-	485	-	485
1996*	2	1	82	85	167
1997	2	-	180	-	249
1998	3	1	249	-	249
1999-00	1	-	61	15	76
2000-01	8	-	220	165	385
2001*	3	-	107	-	107
<b>Total</b>	<b>68</b>	<b>13</b>	<b>12,365</b>	<b>519</b>	<b>12,884</b>

\* upto May, 2001

**Table 2. Details of germplasm collected in different crops (1980 to May, 2001)**

Crop Groups	Important Crop Species	
Cereals and Millets	Barley (129), Maize (308), Pearl millet (762), Sorghum (96), <i>Oryza sativa</i> (111), Wheat (337), Minor Millets (38) and others (42)	1823
Pulses and Legumes	Chickpea (506), Cowpea (237), Guar (3044), Mothbean (640), Mungbean (766), Pigeonpea (138), Urdbean (121) and others (32)	5484
Oilseeds	Castor (135), Groundnut (177), Mustard (250), Taramira (65), Til (1037), Tumba (161) and Others (4)	1829
Fibres	<i>Corchorus olitorius</i> (76), Cotton (145), Kenaf (63) Sunn-hemp (52) and others (22)	358
Vegetables	Brinjal (203), Chillies (299), <i>Cucumis</i> spp. (299), Garlic (44), Ker (140), Lasora (86), Okra (134), Pea (73) and Others (151)	1429
Fruits and Minor fruits	Ber (175), <i>Coria rothii</i> (24), Khejri (404), Matira (124), Muskmelon (105), Pomegranate (24) and Others (84).	940
Medicinal plants		117
Halophytes	<i>Salicornia brachiata</i> (5), <i>Suaeda fruticosa</i> (8) and others (8)	22
Spices and Condiments	Coriander (80), Cumin (36), and Methi (51)	167
Fodder Plants	<i>Cenchrus</i> spp. (3), <i>Lasiurus indicus</i> (65), <i>Sesbania</i> spp. (43) and others (15)	153
Wild relatives/Weedy forms	Okra (143), <i>Sesamum</i> sp. (100), <i>Solanum</i> spp. (32) and others (64)	339
Miscellaneous	<i>Corchorus</i> spp. (133), <i>Tephrosia purpurea</i> (31), others (50)	223
<b>Total</b>		<b>12,884</b>

The local landraces collected in different crop groups were:

Wheat	<i>T. aestivum</i>	Safed kanak	<i>T. durum</i>	
	Bodiya gehun	Sachiya	Armej Gehun	
	Contoli gehun	Teria	Armej Katha	
	Deshi gehun	Tukara	Bansi	
	Deshi Lal gehun	Vajya	Bhatiya Desi	
	Dhola gehun		Daut Khani	
	Kotbajiya	<i>T. dicoccum</i>	Futel	
	Kharchiya gehun	Jau	katha	
	Lal gehun	Popatiya	Kathiya	
	Moti	Putadiya	Poonagiri	
	Nana gehun	Putragehun	<i>T. sphaerococcum</i>	
	Pili kanak	Putrajau	Patoliya	
	Barley	Desi Jov		
		Desi makki	Hatti Makki	Malan Makki
	Maize	Satti makki		
	Rice	Akoli Bhat	Ekngare	Kosure
		Altiya	Ekdaudi	Lakshari
Ankalo		Futiya	Lakshari Bhuri	
Ausi		Geton	Lakshari Sona	
Bangalo		Gutniyao	Lal Dangar	
Barihai		Halaki	Markolin	
Batli Bhat		Kauchi	Masuri	
Bhujhavalia Bhat		Hari Bangalo	Nanisal	
Chawara		Hathi,	Panjial	
Chocolate		Indrani	Pejje	
Cholli Desi		Jaware	Podhari	
Dabla		Jhadaki	Rata Chawal	
Dabohal		Jhini Sathi	Rodi Kawod	
Dabual		Jodohallio	Ratiya Dangar	
Dadrcolon		Kada	Saket, Sathi	
Dalaki		Kajal Hari	Sativa Dangar	
Dang Bhat		Kala Kundiya	Sukhwel	
Dault Puri		Kali Dangar	Sutrasal	
Desi Bath		Kalinga	Taichun	
Desi Dangar		Kansarvav Karojo	Thumbati	
Desi Sathi		Kirali	Tulshya	
Dhaur		Khadasi	Ubhi Dangar	
Dhanpari		Khadsia	Vardala	
Dholi Bhatt		Khasriva Dangar	Vijalपुरi	
Dholi Danger		Kolpi		
Pearl Millet				
Sorghum		Desi	Dhorki	Gundri
Sesame		Bhanwari tilli	Dhili tilli	Zhumak tilli
Cotton		Dhumad Kalvan	Mathio	
		Vara	Waged	
Ber		Banarasi	Kaithali	Noki
		Chhuahara	Kalingada	Pathan
		Chonchal	Karava	Porda
		Dak	Kara	Rashmi
		Daudan	Kathaphal	Sandhura Narnaul Seb
		Gola Kela	Sotai	
		Kakrol	Lasora	Umaran
		Ilaichi		
		Desi Lesua	Lesu	Pemali Lesua
		Balam Kakadi	Balam Kheera	
		Chillies	Bayana Local	Haripur Rati
Bilara Local			Mathania Lambi	Reshampatti
Ghumari Tikhi			Mehasana Charkhun	Tonkey Local
Fenugreek		Achar Maithidana	Nagouri Maithi	Nainaki Maithi
		Dana Methi		

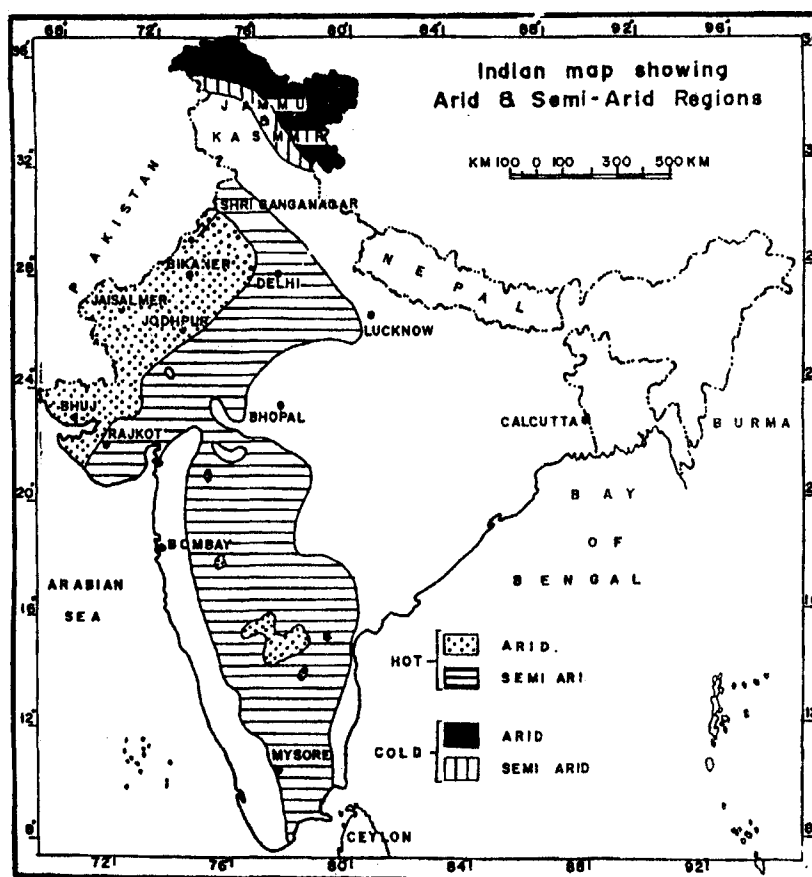


Fig. 1 Map of India showing arid and semi-arid regions

information on the samples collected. Local names, names of landraces, their uses, indigenous knowledge and role of women in the conservation of crop/plant species were also recorded. A wide range of variability has been recorded in the distribution, plant habit and type, canopy, earliness, bearing, size, shape and colour of leaves, flowers, fruits and seeds, weight of fruits and seeds etc. (Fig. 1).

**Wild relatives/wild species/weedy forms:** In all, 519 collections of various wild relatives/wild species/weedy forms were collected during these explorations and collection missions. Some of these are *Abelmoschus ficulneus*, *A. manihot*, *A. tetraphyllus*, *A. tuberculatus*, *Corchorus aestuans*, *C. depressus*, *C. fascicularis*, *C. tridens*, *C. trilocularis*, *C. urticaefolia*, *Cordia rothii*, *Crotalaria medicagenia*, *Cucumis callosus*, *C. hardwickii*, *C. hystrix*, *C. prophetarum*, *C. tridens*, *Diospyros montana*, *Luffa acutangula* var. *amara*, *L. hermaphrodita*, *Sesamum mulayanum*, *Solanum indicum*, *S. nigrum*, *S. saeforthianum*, *S. surattense*, *Tephrosia*

*purpuria*, *Vigna radiata* var. *sublobata*, *V. trilobata*, wild guar, wild pea etc.

Local/desi cultivars were preferred due to their desired traits/adaptability, nutritive value, better taste and higher fodder yield e.g. *Triticum durum*. *Cucurbits* viz. - *Citrullus vulgaris* var. *fistulosus*, *Cucumis callosus*, *C. melo* var. *argestris*, *C. melo* var. *momordica*, *C. hardwickii*, *C. sativus* and *Luffa hermaphrodita* are used as vegetables in various forms. Root extract of *C. prophetarum* for cure of earache and fruits to cows and buffaloes for conception. Taramira (*Eruca sativa*) makes soil poor and has allelopathic effects on subsequent crops. Its oil is edible and seed cakes are given to cattle for higher milk production. Dried flower of *Diospyros melanoxylon* are used to cure urinary and skin troubles, its fruits are edible. Seeds or seed cakes of *Hibiscus cannabinus* are mixed with guar, bajra etc. and fed to buffaloes for higher milk production and good quality ghee. Wild relatives/wild species of crop plant (*Corchorus* spp.; *Diospyros montana*, *Solanum*

*indicum*, *S. nigrum*, *S. saefortianum*, *S. surattense*, *Vigna radiata* var. *sublobata* etc.) have important role and value in the lives of village and tribal people (Dwivedi *et al.*, 1998). Ash of cow dung and neem leaves are in general used for storage besides keeping seeds intact (chick pea pods/maize cobs) or in straw (*Triticum* spp.) in air tight traditional vessels/containers.

The collected material with desirable traits may be used as a good source of breeding material to improve selected crops or may be used directly for human welfare.

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## Evaluation of Different Sucking Mango Strains Under Sub-Tropical Sub-Mountainous Tracts of Punjab

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**Key Words:** Mango, Evaluation, Fruit Variability, Juicy Mango

Apart from table purposes, mango is also known for sucking qualities. For sucking purposes, good proportion of juice content with favourable amount of TSS, acidity and fibre on the stone are the main criteria. Large variability exists in sucking mango varieties in India. Also in Punjab State, a great diversity in quality, shape and colour of sucking mangoes have been recorded. The quality as well as the flavour of the fruit varied greatly with the change in climatic and adaphic conditions. Some of the strains of sucking mangoes were evaluated for their performance under local conditions.

More than 60 strains of mango were collected from different sources and evaluated at Fruit Research Station, Gangian. The trees were of 21 years old and received uniform cultural practices. The stem girth and tree height was measured with the help of measuring tape. The

floral malformation was recorded in the month of April by counting the infected panicles and then the percentage was calculated from the total number of panicles on the tree. The fruit number was counted from the individual tree before the fruit harvest. The fruit yield was calculated by multiplying the fruit weight with the total number of fruits of the tree. The weight of the fruit, peel and stone was measured on pan balance. The peel and stone weight was subtracted from the total weight of the fruit to calculate the juice content. The fruits were analysed for TSS and acidity as per standard procedure of A.O.A.C. (1980).

The data presented in Table 1 revealed that the strain GN<sub>1</sub> was the most vigorous which recorded stem girth of 125 cm and tree height of 8.0 m. However, the maximum (128 cm) stem girth was noted in GN<sub>12</sub>. But, the lowest (94 cm) stem girth and tree height (5.5 m) was recorded in GN<sub>2</sub>. Ramasowamy (1989) also reported great variation in growth parameters in mango cultivars.

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