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Plant Genetic Resources : Collection and Promising Introductions for arid and semi-arid regions

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Both crop-specific and region-specific/multicrop explorations have been carried out by the Regional Station of NBPGR, Jodhpur since its inception in 1965. 7074 collections of diverse crop germplasm have been made from arid and semi-arid regions of Gujarat, Haryana and Rajasthan. Rich variability in germplasm collected comprises pearlmillet (593), chickpea (116), clusterbean (2969), cowpea (206), mothbean (555), mungbean (721), pigeonpea (76), sesame (499), chillies (123) and several other plants (1216) including vegetables, plants of economic importance, etc. Promising accessions have been identified in following agricultural crops : (i) cowpea (vegetable type : NS 24/8-2 (Pusa Aseem), P 460-1-1; grain type : EC 13060, PLC 7); (ii) guar (vegetable type branched : IC 11704 (Sharad Bahar), IC 11388; grain type branched : IC 9065, IC 9229/P_3, IC 11521; grain type single stemmed : PLG 80, PLG 85), (iii) moth (PLMO 39, PLMO 55, IC 8851); (iv) mung (EC 35537, PLM 44); and (v) til (EC 43656, EC 43559, IC 14072) which have been recommended for cultivation in arid and semi-arid regions. Among horticultural plants, four varieties of ber, viz. Gola, Seb, Mundia-Marhera and Jogia have been identified which are best suited to this region. An indigenous collection of seedless pomegranate has shown excellent performance. Natal plum (Carissa grandiflora *EC 37513) and* C. edulis (*EC 35952) introduced from USA have shown good performance. Out of a dozen collections of jojoba* (Simmondsia chinensis), *a liquid-wax yielding plant introduced from USA, one accession (EC 33198) has been found suitable. Among the forage resources,* Acacia albida (*EC 133772 ex., Senegal),* Atriplex canescens (*EC 129768),* A. halimus (*EC 129767),* A. numularia (*EC 129766), all from Tunisia, and* Cassia sturtii (*EC 129010 ex. Australia) have been identified which are better suited to this region. Two species of* Agave *viz.* A. americana *and* A. sisalana *were found promising.*

Germplasm collection and introduction of new crop plant species, their wild relatives and divergent forms have played tremendously important role in exploitation of such resources in the past. Several countries have benefitted imensely and have also been able to overcome the problems being confronted by them. The regional station of NBPGR located in the arid region (desert)

of Rajasthan has introduced, evaluated and identified several promising varieties and strains which are discussed in the present paper.

MATERIALS AND METHODS

Both crop-specific and region specific/multicrop explorations were undertaken using random collection strategies. Sampling adequate amount of seeds representative of a local population, germplasm collection amounting well over 87,074 accessions were built at Jodhpur from arid and semi-arid regions of Rajasthan, Gujarat and Haryana. Rich diversity comprised pearlmillet, chickpea clusterbean, cowpea, moth bean, mung bean, pigeon pea, sesame, chillies and several other plants including vegetables and other wild plant species of economic importance (Table 1).

TABLE 1. GERMRLASM COLLECTIONS MADE BY NBPGR REGIONAL STATION JODHPUR (1980—1986)

Group	Crop	Number of Collections
Cereals and millets	Barley (48), Maize (64), Pearlmillet (593), sorghum (48), wheat (40).	793
Pulses/legumes	Chickpea (116), cowpea (206), guar (2969), moth (555), mung (721), pigeonpea (76), urid (78).	4721
Oilseeds	Castor (22), groundnut (66), naiya (26) taramira (16), til (499)	629
Fibre crops	Cotton (104)	104
Fruits	Ber (*Zizyphus mauritiana*) (18), ber (*Z. nummularia*) (16) ber (*Z. rotundifolia*) (19), Matira (27).	80
Vegetables	*Bhindi* (32), brinjal (9), chillies (123), *methi* (14)	178
Others	Aak (5), grasses (23), kenaf (46), ker (35), ringni (7), *Sesbania* spp. (43), sunn hemp (37), tumba (95), *Urginea indica* (12), wild bitter gourd (13), wild *bhindi* (16) miscellaneous (237),	469

RESULTS AND DISCUSSION

Germplasm collections evaluated well over two decades led to the identification of promising accessions. The elite strains found promising are discussed below : (i) cowpea (vegetable type) NS 24/8-2 (Pusa Aseem), P 460-1-1; grain type : EC 13060, PLC 7); (ii) guar—vegetable type branched—IC 11704 (Sharad Bahar) and IC 11388; grain type branched; IC 9065, IC 9229/P3 and IC 11521; grain type single-stemmed : PLG80, PLG 85; (iii) moth bean (PLMO 39, PLMO 55, IC 8851); (iv) mung bean (EC 35537, PLM 44) and (v) sesame (EC 43656, EC 43559, IC 14072) which have been recommended for cultivation in arid and semi-arid regions (Chopra and Mital, 1979).

Data on the yield of these accessions are given in Table 2. From the germplasm of pearlmillet (2,000) and groundnut (2,000), received from ICRISAT for evaluation, several lines have been found performing well. In pearlmillet, 22 accessions having awned type ear head, 20 with bold-seeded grain and 12 good for fodder have been identified. Based on grain yield data, 80 accessions have been selected for further evaluation. In groundnut, 103 accessions showed early flowering; and the basis of pod weight/plant, 33 accessions have been selected for further evaluation.

TABLE 2. YIELD OF PROMISING ACCESSIONS OF VARIOUS FIELD CROPS (AVERAGE YIELD OVER THREE YEARS)

Crop	Type	Accessions	Yield (q/ha)
Cowpea	Vegetable	NS 24/8-2 (Pusa Assem)	82.0
		P 460-1-1	69.0
	Grain	EC 13060 (USSR)	8.5
		PLC 7	9.0
Guar	Vegetable type,	IC 11704 (Sharad Bahar)	180.0
	branched	IC 11388	130.0
	Grain type, branched	IC 9065	18.0
		IC 9229/P3	17.5
		IC 11521	16.8
	Grain type, single stemmed	PLG 80	18.8
		PLG 85	18.0
Moth bean	—	PLMO 39	5.6
		PLMO 55	5.0
		IC 8851	5.5
Mung bean	—	EC 35537	10.5
		PLM 44	9.8
Sesame	—	EC 43656 (Tanzania)	6.5
		EC 43559 (Mexico)	7.0

Among horticultural plants, four varieties of *ber* viz. Gola, Seb, Mundia, Marhera and Jogia have been identified which are best suited to the arid region of Rajasthan, adjoining Haryana and Western Uttar Pradesh. An indigenous collection of seedless pomegranate has shown excellent performance. Natal plum (*Carissa grandiflora* EC 37513) and *C. edulis* (EC 35952) introduced from USA have shown good performance (Chopra and Mital, 1979).

Several other economic plant introductions are being tried at this station. Out of several collections of jojoba (*Simmondsia chinensis*), a liquid-wax yielding plant introduced from USA, one accessions (EC 33198) has been found suitable. Two species of *Agave* for fibre *viz. A. americana* (EC 27644) and *A. sisalana*, introduced from USA have been found promising under arid and semi-arid conditions (Chopra and Mital, 1979). Among the forage resources, *Acacia albida* (EC 133772 ex. Senegal), *Atriplex canescens* (EC 129768), *A. halimus* (EC 129767) and

A. numularia (EC 129766), all from Tunisia (Chopra *et al.*, 1982) and *Cassia sturtii* (EC 129010 ex. Australia) have been identified, which are better suited to this region. *Parthenium argentatum*—guayule (rubber plant), *Euphorbia tirucalli* (hydrocarbon plant), *Acacia* sp., *Prosopis* sp., *Eucalyptus* sp., etc, are being evaluated.

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