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Short Communication

GENETIC RESOURCES OF ARID LEGUMES IN INDIA

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The cultivated arid legumes have been the main stay in traditional crop production, provide food for man, fodder for animals and raw materials for various industries. These includes four annual crops viz., guar (*Cyamopsis tetragonoloba*), Mothbean (*Vigna aconitifolia*), cowpea (*Vigna unguiculata*) and horsegram (*Macrotyloma uniflorum*). This group of crops is normally grown in the arid and semi-arid regions of the country because the inbuilt potential in them, meet the un-congenial situations like water stresses and dry atmosphere. The natural variability of these arid legumes also is mostly available in the drier belt of the country. In the recent past, good efforts have been made at the NBPGR, New Delhi to collect, evaluate, document and conserve this variability. This paper reviews the present status of the germplasm holding and its utilization of the arid legumes.

Guar (*Cyamopsis tetragonoloba*)

Clusterbean (*Cyamopsis tetreagonoloba* (L). Taub.), commonly known as guar, is a drought hardy crop of the arid and semi-arid regions of the Indian continent. It is generally grown for feed, fodder and vegetable purposes, but of late, it has assumed a great industrial importance mainly due to the presence of gum content in its seed. Guar gum is a mucilaginous mixture of galactose and mannose and has diversified industrial uses. Today guar gum and its derivatives are in great demand in the world market and India earns foreign exchange worth Rs. 80 crores annually.

In India, guar is grown as a rainfed crop in the states of Rajasthan, Gujarat, Haryana, Punjab and parts of Uttar Pradesh, Madhya Pradesh and Maharashtra on nearly 2.81 million hectares and produces ca 1.11 million tonnes of guar seed. Work on its improvement was initiated by the erstwhile

Plant Introduction in early sixties on vegetable types and later on collection, evaluation, documentation and utilization of the natural variability. These efforts has resulted in the assemblage of 4727 accessions (Table 1) at the NBPGR. The co-ordinated project on voluntary basis was started during 1977 which later assumed regular status of All India Co-ordinated Research Project on Guar by the ICAR. Under the project, several varieties viz., I.C. 9229/P_3, HG75, HG 258, GAUG 34, Maru Guar, GGI (Late-varieties); Naveen and RGC 936 (Early varieties) and HG 314, PLG 85 and RGC 197 (unbranched varieties) were evolved which suit under different cultivation practices. By adopting these varieties alongwith the improved cultivation practices and plant protection technology (Dabas *et. al.* 1991), the production can be increased on an average from 2-3 q/ha, which at present is very low (about 2.8 q/ha at the national level.

Cowpea (*Vigna unguiculata*)

Cultivated cowpeas are annual herbs with a great range of growth habits and response to photoperiod and great variation also in seed characters. More or less erect, determinate, day-natural types are commonly grown as sole crops for seed or for forage, whereas prostrate indeterminate, short day types are sometimes grown as mixed farming.

Its origin is uncertain, probably in central or tropical African origin where wild races still exist. In India it has been known sice vedic times and India and China are considered as secondary centres of origin. Cowpea is values primarily for its pod as vegetable, seeds as pulse and plant as a valuable feed for livestock. The protein content of the dried mature seeds of cowpea varies from 20-30 per cent. It is also grown as a cover or green mannure crop for soil improvement. Work on the improvement of cowpea was initiated during sixties at IARI/NBPGR with more emphasis or development of vegetable type and collection/introduction of germplasm.

NBPGR has built up the germplasm accessions of 3842 through introduction from different countries and collection from within the country. Grain cowpea improvement Project in 1965-66 which subsequently upgraded to Project Directorate, Directrorate of Pulses Research and Indian Institute of Pulses Research in 1994. On creation of AICRP on Arid Legumes, the mandate of the improvement of this important pulse has been shifted from DPR to this project in 1991. Systematic and concentrated efforts have been made to develop production technology through multidisciplinary team of research scientists working in different agro-ecological zones of the country. 25-30 per cent production can be increased by utilization of the improved varieties, use of fertilizers and plant protection technology development.

Moth bean (*Vigna aconitifolia*)

Mothbean is native of India and domesticated recently as compared to the other pulses like black gram or green gram. It is mostly grown in India and to a small extent in China. In India, it is an important arid-legume crop cultivated for food to the extent of 1.47 million hectares in Rajasthan, Punjab, Haryana, Madhya Pradesh, Maharashtra, Karnataka, Uttar Pradesh and Bihar where produce 0.51 million tonnes of grain. The area and production of moth bean in the preceeding 20 years indicated that although the area under this in the country has gone down but the total production and productivity are shown an increase. This is attributable to high yielding varieties and use of improved methods of cultivation.

It is an annual, creeping or trailing legume cultivated as a *kharif* crop, sown during June-July and harvested during October-November. It is hardy, drought resistant and can grow on the poorest soils, but it prefers light sandy soil. It is mostly grown as a rainfed crop and can be successfully, cultivated in areas with a well distributed annual rainfall of about 250-500 mm. Varieties like type T for Uttar Pradesh, Jadia, Jwala, JMM 259 and RMO 40 for Rajasthan and Baleshwar 12 and G. Moth I for Gujarat has shown an increase in the production. The production and productivity can be further increased by adopting the production technology and plant protection measures.

Horsegram (*Macrotyloma uniflorum*)

Horsegram popularly known as *kulthi* is a native of India and is distributed throughout the tropical regions of the old World. It is grown all over India as an important pulse crop particularly in Karnataka, Tamil Nadu, Maharashtra, Andhra Pradesh, Orissa, Madhya Pradesh and Bihar. It is generally grown as feed for cattle and seeds as concentrates. Its seed are also consumed by the poorer classes after cooking or frying. It is often grown as a preparatory crop on reclaimed lands. The germplasm collected from various parts of the country is given in Table 1.

Table 1. Germplasm holdings of various arid legumes in National Genebank and active collections

Crop	Genebank	Active collection	
		Total	Centrewise
Guar	1401	4827	Delhi, Jodhpur
Cowpea	2003	3434	Delhi (2461) Thrissur (590), Jodhpur (345) and Bhowali (38).
Mothbean	273	2143	Jodhpur (1978) Amravati (165)
Horsegram	952	1684	Akola (826), Thrissur (734) Jodhpur (48) and Shimla (76).