

Introduction of wild species of various pulses viz. *Cicer reticulatum*, *C. echinospermum*, *C. canariensis*, *C. oxoydon*, *C. anatolicum* and *C. songaricum*; *Cajanus albicans*, *C. platycarpus*, *C. cajanifolia*, *C. cinereus*, *C. scarabeoides*, *C. kerstingii*, *C. judaicum*, *C. pinnatifidum*, *C. cuneatum*, *C. yamashitae*, *C. bijugum*; *Lens culinaris*, *L. orientalis*, *L. nigricans*, *L. odemensis*; *Lathyrus cicera*, *L. cilliolatus*, *L. ochrus* and similarly in other pulses, have enriched our collections and

contributed to germplasm enhancement and pre breeding.

#### References

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## Performance of Exotic Pulses in Arid and Semi-Arid Region of India

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Pulses have been grown in India since time immemorial under various agro-ecological situations. This led to the development of enormous genetic variability during the course of evolution (Asthana, 1988). India is an important centre of diversity for several grain legumes (De Condolle, 1884; Vavilov, 1926; Zhukovsky, 1950). The important pulses grown in the arid and semi-arid region of India are chickpea (*Cicer arietinum*), cowpea (*Vigna unguiculata*), field pea (*Pisum sativum*), guar (*Cyanoopsis tetragonoloba*), horsegram (*Macrotyloma uniflorum*), mothbean (*V. aconitifolia*), mungbean (*V. radiata*), pigeonpea (*Cajanus cajan*) and Urd bean (*V. mungo*). National Bureau of Plant Genetic Resources, New Delhi has been endeavouring to build up the genetic resources in pulses from India as well as from abroad. Present communication deals with characterisation, preliminary evaluation and identification of promising accessions in exotic cowpea, guar, mothbean and mungbean germplasm.

Four hundred and twelve exotic accessions comprising of cowpea (269 accessions), guar (12 accessions), mothbean (48 accessions) and mungbean (83 accessions) including two wild species of guar (*Cyamopsis senegalensis* and *Cyamopsis serrata*) were introduced from Mexico, Nigeria, Srilanka, Taiwan, USA and erstwhile USSR during 1975-2004 through NBPGR, New Delhi. These accessions were characterized for various morpho-agronomical traits at NBPGR Regional

station, Jodhpur (26° 18' N and 73° E, altitude 224m) during *kharif* seasons of 1976-1977, 1978-1979, 1991-1992, 1994-1995 and 2004-2005 in an augmented design under rainfed (cowpea, guar and mothbean) and irrigated conditions (mungbean). Each accession was grown in two rows of 3m length, with inter and intra-row spacing of 60 and 15 cm, respectively. The data were recorded on five plants selected randomly from each of the accessions and observations were recorded on plant habit and height; size, shape and colour of leaves; days to 50% flowering and maturity; flower colour; number of branches; cluster per plant; pods per cluster and per plant; length of cluster, peduncle and pod; shape and colour of pod; presence of pod grooves and beak; size, shape and colour of seeds; seed hilum/eye colour; type of seeds; number of seeds per pod; pod and seed yield per plant and 100 seed weight. The data for individual plants were pooled and range, mean, standard deviation and phenotypic coefficient of variation were calculated for the observed parameters.

There was considerable variability in the introduced germplasm of each crop for most of the important traits (Table 1). Early maturing grain type accessions were EC 101929, EC 109493-2010-1 (cowpea); EC 37745 (guar); EC 100065 (mothbean); EC 520038 and EC 520041 (mungbean). Maximum number of branches was recorded in EC 36954 (guar); EC 100064, EC 100066 (mothbean); EC 512792 and EC 520009 (mungbean).

Table 1. Variability parameters for important characters in exotic pulses

Character	Cowpea		Guar		Mothbean		Mungbean	
	Range	Mean	Range	Mean	Range	Mean	Range	Mean
Days to 50 % flowering	40 – 60	48	35 – 45	41	32 – 90	66	32 – 61	49
Days to 50 % maturity	54 – 90	64	114 – 116	115	60 – 110	89	55 – 90	78
Plant height (cm)	14 – 80	25.1	48 – 107	78.4	11.7 – 35.4	26.2	12.8 – 45.4	31.9
Branches	1 – 10	5.6	2 – 9	6.0	2 – 8	5.0	1 – 6	3.0
Seed yield/ plant (g)	2.5 – 48.9	18.2	4 – 11	6.8	1.6 – 8.1	5.1	0.1 – 17.2	6.3
100 seed weight (g)	4.7 – 19.7	10.0	2.8 – 4	3.4	1.8 – 2.6	1.9	2.9 – 8.8	6.1

Accessions EC 101929, EC 109493-2010-1 (cowpea); EC 248A, EC 36954-P4-1, EC 36954-P5 (guar); EC 100064 (mothbean); EC 520037, 520038 and EC 520041 (mungbean) had maximum seed yield per plant. Highest 100 seed weight was recorded in EC 61395, EC 367682 (cowpea); EC 36954 - P4 -1, EC 36954 - P5 (guar); EC 100064 (mothbean); EC 512793, EC 520042 and EC 520043 (mungbean). EC 107183, EC 107191 (cowpea), EC 2484, EC 2448 – P3, EC 36951 and EC 36952 (guar) were identified as vegetable types. Bold and white coloured seeds were noticed in EC 367680, EC 367682 and EC 367683 (cowpea). Bhatnagar and Bhandari (1999) also reported some promising early maturing exotic collections of cowpea germplasm. In *Cyamopsis senegalensis* and *C. serrata* seeds shatter after pod maturation.

These promising accessions with desirable superior traits can be of immense value for the pulse breeding

programme in arid and semi-arid regions of India. In future, these accessions can also be screened for disease and pest resistance and various quality parameters.

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## ABSTRACTS

### Genetic Variability and Associations among Agro-Morphological Traits in Exotic Germplasm of Pea (*Pisum sativum* L.)

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Pea (*Pisum sativum* L.) is an important winter crop and believed to be evolved in Mediterranean basin. The success of any breedings programme depends upon the availability of diverse germplasm and their judicious utilization.

Therefore, efforts were made to augment the germplasm through introduction and their evaluation for yield and yield components. In present study 32 germplasm accessions were introduced from Germany, Japan, Russia, Syria, Taiwan, UK and USA.

Genetic variability parameters such as phenotypic and genotypic coefficient of variations (PCV and GCV), heritability and genetic advance were estimated for various agro-morphological traits. High estimates of PCV and GCV were observed for plant height, yield per plant, clusters per plant and primary branches where as moderate for seeds per pod, pod length and pods per plant, indicating wide variability in the material for these traits. However, there was little variability