SHORT COMMUNICATION

Identification of an Upright Peduncle and Podding Genotype in Chickpea Germplasm Conserved in the National Genebank

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A total of 18,873 accessions of chickpea germplasm were characterized in 2011-12, which were conserved in National Genebank at National Buearu of Plant Genetic Resources. IC486088 was found to bear upright peduncle and podding behaviour. This trait has special significance in breeding varieties amenable to mechanical harvesting to save labour requirement used for manual harvesting.

Key Words: Characterization, Chickpea, Upright podding

India is the largest chickpea producing country with a share of about 64% of global chickpea production (FAOSTAT, 2012). Chickpea is the most important pulse crop in India in terms of both area and production. During the last 10 years, although the productivity of chickpea has increased by 1.74%, but the gross chickpea production has gone up by 6.32% and the area by 4.43%. Consecutively for the third year in a row, there has been increase in production, with a record production of 8.25 Mt achieved during 2010-11 (AICRP Chickpea, 2011-12).

Cultivated chickpea (*Cicer arientinum* L.) has two distinct forms, *i.e. Desi* (small seeded, angular shaped and coloured seeds with high percentage of fibre) and *Kabuli* types (large seeded, owl shaped, beige coloured seeds with a low percentage of fibre). The average yield of chickpea is still low in India and further genetic improvement is constrained by the non-availability of appropriate germplasm. Further, there is a scope for widening the genetic base of cultivated varieties through pre-breeding. Plant genetic resources are the reservoir of useful gene/allele sources and provide basic raw materials for further genetic improvement. National Bureau of Plant Genetic Resources (NBPGR) is the nodal organization in the country and is actively involved in the plant genetic resources management since long through the germplasm exploration and collection, characterization, evaluation and conservation in the National Genebank.

Chickpea, being an important pulse crop, has received due attention in the introduction and conservation of genetic resources in India. So far, approx. 56,925 accessions including international nurseries/trials have been introduced from 56 countries (NBPGR, 2011-12). The International Centre for Agricultural Research in the Dry Areas (ICARDA), Syria, has been an important source of introduction from where about 15,880 accessions of chickpea were introduced. Currently, 14,061 base collections are conserved in the National Genebank under long-term storage at NBPGR, New Delhi, of which 11,438 are of indigenous and 2,623 are exotic origin conserved in the long-term storage (LTS) of the National Genebank.

The Bureau undertook a large scale characterization and evaluation programme of the entire chickpea germplasm (LTS) and some collections maintained under medium-term storage (MTS) at AICRP - Chickpea centre, Mahatma Phule Krishi Vidyapeeth (MPKV) Rahuri, Maharashtra, in a collaborative mode to enhance their proper utilization, during *rabi* 2011-12. A total of 18,873 germplasm accessions were grown under Augmented Block Design with three improved varieties, *viz.* – Vijay, Digvijay and Vishal as checks.

The observations were recorded on 20 agro-morphological traits, *viz.* – early plant vigour, plant growth

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Fig. 1. (a) Unique upright peduncle and podding (b) Normal droopy peduncle and podding

habit, plant pigmentation, number of leaflets/leaf, leaflet size (cm), plant pubescence, days to 50% flowering, flower colour, plant height (cm), number of primary branches/ plant, biomass score, number of pods/plant, pod shape, number of seeds/pod, days to 80% maturity, seed colour, testa texture, 100-seed weight (g) and seed yield/plant (g) as per chickpea minimal descriptors. While recording these various morphological and agronomic traits in the entire chickpea germplasm, one accession IC486088, was found to bear upright peduncle and podding behavior (Fig. 1a), in contrast to the generally observed podding behavior, which is of droopy nature (Fig. 1b). This unique trait was further validated in the off-season Himalayan nursery at Chaudhary Sarwan Kumar, Himachal Pradesh Agricultural University, Research Station, Sangla, H.P., during summer 2012, where the upright podding behavior was found to be true to its type. Different agro-morphological traits of this accession as compared to one of the check varieties Vijay, is given in Table 1. Field view of chickpea germplasm grown at Mahatma Phule Krishi Vidyapeeth, Rahuri during *rab*i 2011-12, and its further validation during off-season nursery (in pots) at Chaudhary Sarwan Kumar, Himachal Pradesh Agricultural University, Research Station Sangla, H.P. is presented in Fig. 2.

The upright podding trait has a special significance for its possible utility in breeding verities amenable to mechanical harvesting of chickpea which is becoming increasingly important in view of huge labour requirement for manual harvesting of crop and the associated drudgery involved with it. This unique accession bearing special

Table 1. Performance of the upright podding chickpea genotype, IC 486088 for various agro-morphological traits in comparison with the best check Vijay

S. No.	Geno-type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		PLT_ VGR	GRW_ HAB	PLT_ PIG	LFLT_ LF	LFLT_ SIZ	PUB	DAY_ FLW	FLW_ CLR	PRI_ BRN	BIOM	PLT_ HT	POD_ PLT	POD_ SHP	SED_ POD	DAY_ MAT	SED_ CLR	SED_ SHP	SED_ SURF	GRN_ YLD	SED_ WGT
1	IC 486088	3	3	3	4	2	5	55	6	3.6	2	62.0	42.0	3	1.6	104	17	1	7	18.6	15.0
2	Vijay (check)	3	4		5	2	99	42	5	4.2	2	33	46.3	1	1.3	93	3	1	7	19.6	19.2

1	PLT_VGR	Early plant vigour	8	FLW_CLR	Flower colour	15	DAY_MAT	Days to 80% maturity
2	GRW_HAB	Plant growth habit	9	PRI_BRN	Number of primary branches/plant	16	SED_CLR	Seed colour
3	PLT_PIG	Plant pigmentation	10	BIOM	Biomass	17	SED_SHP	Seed shape
4	LFLT_LF	Number of leaflets/leaf	11	PLT_HT	Plant height (cm)	18	SED_SURF	Seed surface (testa texture)
5	LFLT_SIZ	Leaflet size (cm)	12	POD_PLT	Number of pods/plant	19	GRN_YLD	Grain yield/plant (g)
6	PUB	Plant pubescence	13	POD_SHP	Pod shape	20	SED_WGT	100-seed weight (g)
7	DAY_FLW	Days to 50% flowering	14	SED_POD	Number of seeds/pod			

Fig. 2. (a) Field view of chickpea germplasm grown at MPKV, Rahuri, Maharashtra,(b) chickpea accession, IC486088 showing upright podding behaviour in the field and (c) validation of upright podding trait during summer 2012 at CSKHPKV, RS, Sangla Himachal Pradesh

trait of interest can be further investigated to understand its inheritance pattern.

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