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ASSESSMENT OF GENETIC VARIABILITY IN CHICKPEA (KABULI) GENOTYPES FOR SEED YIELD AND YIELD ATTRIBUTING TRAITS

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ABSTRACT

Twenty one genotypes of chickpea were evaluated to study the magnitude of genetic variability, for yield and yield contributing characters. The genotypes *viz.,* BG3026 (2285 kg/ha) and HK 08-231 (2167 kg/ha) recorded significantly superior seed yield over best check BG 1003 (1839 kg/ha). The genotype Phule G 09311 recorded highest mean performance for 100-seed weight (49.83 g) followed by Phule G 09316 (48.72 g) and RVSSG-12 (45.94 g) while these genotypes also recorded earliest in flowering. Highest mean performance for days to maturity were recorded by GNG 2112 (141 days) followed by HK 08-212 and GLK 27242(138 days) while the genotypes viz., Phule G 09316 (129 days), BG 3026 (132 days) and BG 1003 (133 days) exhibited lowest mean performance for days to maturity. Hence these genotypes indicate the presence of a considerable proportion of total variability due to genetic causes and may serve as effective parents during breeding programme for crop improvement. Therefore evaluation of genotypes for genetic variability is essential for the present as well as future crop improvement programme of *Kabuli* chickpea.

Key words : *chickpea, genetic variability, yield and kabuli*

Chickpea (*Cicer arietinum* L.) is a self self-pollinated and diploid (2n=16) crop species with a genome size of 931Mb. Chickpea is the only cultivated genus *Cicer* which has 43 species (1). Chickpea is a valuable source of dietary protein in many parts of the world for humans and in some cases, animal feed. The crop sown after chickpea is benefited by improved soil fertility (mainly through N2 fixation by chickpea), particularly in the rainfed areas. Chickpea is an excellent source of protein and carbohydrate and its protein is of high quality as compared to other pulse crops (2).

The area of chickpea in Bihar has declined considerably during the past four decades. During 1970 to 1980, the chickpea area in Bihar was 217,000 to 262,000 ha, which has now decline to about 60,000 ha due to lack of availability of seed of improved varieties and the unawareness of farmers about improved varieties. Also, Tal area which was famous for chickpea cultivation has been replaced by other pulses with only isolated patches of chickpea area. So, there is a need to assess high yield potential chickpea genotypes against the adverse climatic condition for enhancing the area and productivity of chickpea in Bihar. Genetic improvement of any crop mainly depends upon the amount of genetic variability present in the population and the germplasm serves as a valuable source of base population and provide scope for wide variability (3). The importance of broad genetic base in evolving new cultivars by incorporating new genes in the existing one is well organized. Being a self-pollinated crop, chickpea exhibits a good amount of variability for various characters.

The improvement in crop yield depends upon the genetic variability available in breeding material and the extent to which the yield component traits are heritable from generation to generation. Genetic variation among traits is important for breeding and in selecting desirable types. The wide genetic diversity that exists in the available genotypes provides ample scope for further improvement. Importance of genetic diversity for selecting parents in combination-breeding programme of different crops to recover transgressive segregates has been emphasized (4). Even though a lot of research work has been conducted on variability and divergence in chickpea but the variation is a continuous process. Therefore evaluation of genotypes for genetic variability is essential for the present as well as future crop improvement programme of *Kabuli* chickpea. Keeping this in view,

Table-1 : Yield and yield attributes of Kabuli chickpea genotypes under rainfed condition of Bihar.

Sl. No.	Genotype	Days to 50% flowering	Days to maturity	Plant stand at harvest	100-seed weight (g)	Seed yield (kg/ha)
1.	GNG 2112	82	141	1.0	38.16	1636
2.	HK 08-212	83	138	1.0	29.01	1914
3.	RVSSG-12	71	136	2.0	45.49	1182
4.	BG 1003 (Check)	81	133	1.0	25.51	2039
5.	HK 08-231	84	137	1.0	24.62	1867
6.	Phule G09311	70	134	1.0	49.83	1580
7.	GNG 2104	83	136	1.3	29.14	1575
8.	BG 3021	80	135	1.0	34.82	1724
9.	BG 1053 (check)	84	137	1.0	32.4	1367
10.	HK 94-134 (check)	86	133	1.7	32.98	1552
11.	BG3025	72	128	1.0	26.94	1668
12.	PhuleG 09316	71	129	1.7	48.72	1784
13.	GLK 28372	87	134	1.0	24.46	1622
14.	RVSSG-11	73	133	1.7	39.68	1126
15.	BG 3026	79	132	1.0	27.47	2085
16.	IPCK 07-62	75	136	1.0	34.73	1654
17.	HK 06-163	80	135	1.0	37.77	1358
18.	GLK 27242	89	138	1.7	35.72	1418
19.	IPCK 06-143	73	137	1.3	37.52	1492
20.	HK 07-171	76	135	1.3	32.35	1761
21.	BDNGK 798	81	133	1.3	32.61	1844

*CD at 5% = 317 and CV (%) = 14.26

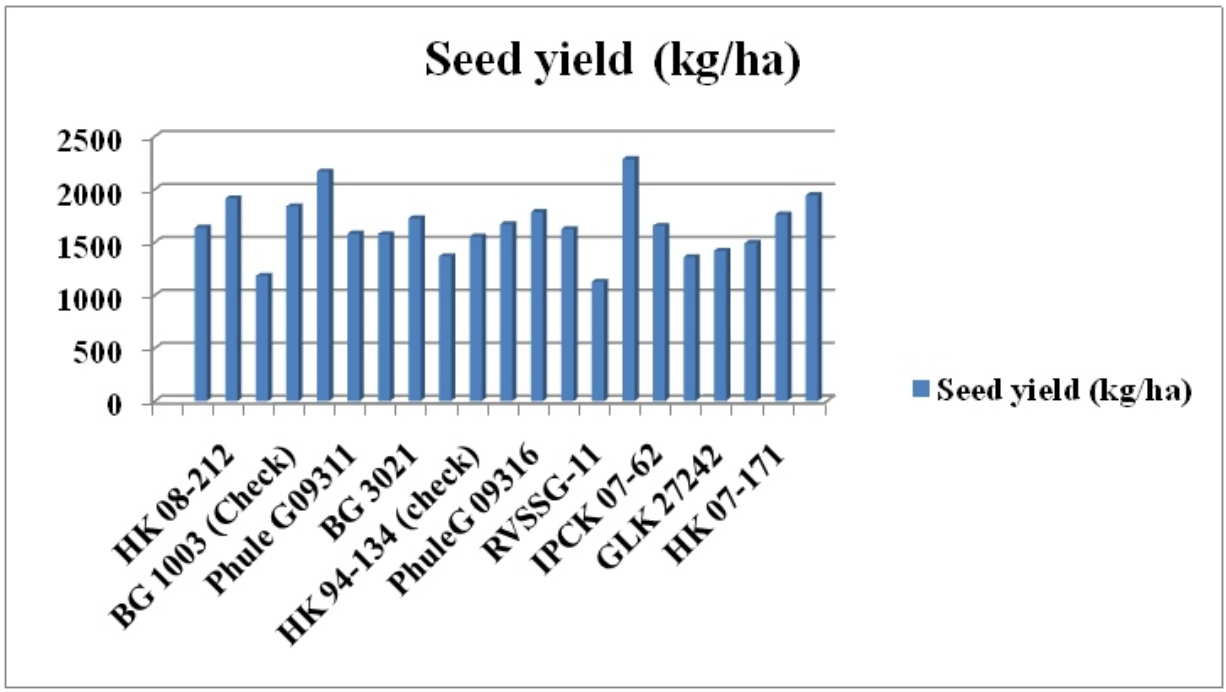

Fig.-1 : Yield and yield attributes of Kabuli chickpea genotypes under rainfed condition of Bihar.

the present investigations were carried out to study genetic variability in Kabuli chickpea genotypes.

MATERIALS AND METHODS

The experimental material comprised of twenty one genotypes of chickpea was evaluated at Pulse Research Centre, Mokama, Bihar Agricultural University, Sabour, Bhagalpur. The experiment was laid in randomized complete block design with three replications during Rabi 2011-12 with inclusion of the recommended packages and practices needed for a healthy crop. Data for six quantitative traits were recorded viz. days to 50% flowering, days to maturity, plant height (cm), plant stand at harvest, 100 seed weight (g) and grain yield per plot. The days to 50% flowering, days to maturity, and seed yield per plot were accounted on a plot basis and plant height, 100-seed weight and grain yield per plot was documented from random sample of five plants in each plot. Data were subjected to statistical analysis.

RESULTS AND DISCUSSION

The analysis of variance revealed significant differences among the genotypes for all the characters (Table-1). This in turn indicated that there was sufficient variability in the material studied, which could be utilized in further breeding programme. Thus, it implied that there was reasonably sufficient variability in material used for the study, which provides ample scope for selecting superior genotypes by the plant breeder for further improvement. Knowledge of genetic system controlling yield and its components is useful in understanding the prepotency of parents and thus help to select parents possessing in built genetic potential. Experimental result (Table-1) showed that grain yield per plot varied from 1126 (RVSSG-11) to 2285 kg/ha (BG 3026).Out of 21 genotypes, two genotypes viz. BG3026 (2285 kg/ha) and HK 08-231 (2167 kg/ha) were found significantly superior over the best check BG 1003 (1839 kg/ha) for grain yield. The genotype Phule G09311 recorded highest mean performance for 100-seed weight (49.83 g) followed by Phule G09316 (48.72 g) and RVSSG-12 (45.94 g) while these genotypes also reflected earliest in flowering. Highest mean performance for days to maturity were recorded by GNG 2112 (141 days) followed by HK 08-212 and GLK 27242(138 days) while the genotypes viz., PhuleG09316 (129 days), BG 3026 (132 days) and BG 1003 (133 days) exhibited lowest mean performance for days to maturity.

CONCLUSION

In order to increase area and production of chickpea crops, we need crop specific and region specific approaches. Already IIPR and ICRISAT with the support of SAU, state and central governments are involved in development of early maturing *kabuli* chickpea genotypes for north east plain zone of India. Thus inclusion of identified high yielding *kabuli* chickpea genotypes viz. BG3026 (2285 kg/ha) and HK 08-231 (2167 kg/ha) is necessary not for increasing production and productivity of in north-east plain zone but also the small and marginal farmers of Bihar meet their various requirements in terms of quantity and quality of food as well as soil health.

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