

Short communication

## Genetic divergence analysis in dolichos bean (*Dolichos lablab* L.) for chhattisgarh plains

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Dolichos bean or Hyacinth bean or Egyptian bean or Sem (*Dolichos lablab* L.) is an important vegetable crop throughout India and especially in Chhattisgarh due to its local acceptability by the people. It is grown on almost all types of soil of average fertility as in case of other beans Eastern M.P. (Now Chhattisgarh State) has wide genetic variability for various traits like plant habit, branching habit, stem pigmentation, leaf veination, flower colour, pod colour, pod characters, viz., shape, size, weight and seeds per pod etc. Hitherto, very little attention is given by the workers on systematic crop improvement work of Dolichos bean. But the genetic variability in Chhattisgarh provides a better opportunity for crop improvement work. Considering these points a study was undertaken to know the genetic divergence in doliches bean grown in Raipur of Chhattisgarh.

The experimental material comprised of sixty three diverse genotypes of Dolichos bean. The trials were evaluated during *kharif* and *Rabi* seasons of 2009-10 at Horticulture Farm, of Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). The experiment was conducted in a Randomized Block Design with four replications. Each genotype was sown in 3.6x3.0 m<sup>2</sup> plot

area with a spacing of 1x 1m. All the standard agronomical practices and plant protection measures were followed timely to raise goodcrop. Five plants were selected randomly for recording different yield related traits However, green pod yield and days to first picking were recorded on plot basis. After recording data analysis of the genetic diversity and Mahalonobis D<sup>2</sup> analysis was by Torcher's method as suggested by Rao (1952).

Analysis of variance revealed that genotypic differences were significant for all the characters. The range of variation was wider in green pod yield that was from 66.78 q/ha to 155.09 q/ha. Largest pod length was recorded 15.30 cm, whereas smallest pod length recorded in 4.12 cm.

The highest value of Genotypic coefficient of variation (GCV) was recorded for pod width (30.68%) followed by pod length (26.07%), number of pods per inflorescence (23.08%). Length of inflorescence (23.07%), hundred seed weight (21.76%), number of pod per plant (20.99% ), marketable green pod yield per plant (19.27%), Whereas, rest of the traits exhibited moderate genotypic coefficient of variation.

The magnitude of phenotypic coefficient of variation was higher than the corresponding genotypic coefficient of variation for most of the characters. The highest heritability estimate was observed for hundred seed weight (98.11%) followed by pod length (97.29%), pod width (96.20%), days to first flowering (95.46), days to 50% flowering (94.79%), length of inflorescence (92.54%), marketable green pod yield per plant (88.22%), number of pods per inflorescence (78.05%). While moderate heritability estimates was recorded in leaf breadth (68.33%) followed by leaf length (60.77%). Low heritability noted by pedicel length (23.41%) and number of pods per plant (23.40%). Higher heritability estimates coupled with high genetic advance as percent

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**Table 1:** Direct and indirect effect of developmental characters on seed yield at phenotypic level in Dolichos bean

Characters	Leaf length (cm)	Leaf width (cm)	Inflorescence length (cm)	Number of flower per Inflorescence	Number of pod per Inflorescence	Pod length (cm)	Pod width (cm)	Number of pod / plant	Hundred seed weight (g)	Yield per plant (kg)
Leaf length (cm)	<b>-0.017</b>	-0.012	0.003	0.002	0.007	-0.006	-0.004	0.001	-0.006	0.213
Leaf width (cm)	0.074	<b>0.103</b>	-0.008	-0.008	-0.040	0.018	0.013	-0.006	0.034	0.202
Inflorescence length (cm)	-0.006	-0.003	<b>0.047</b>	0.047	0.020	-0.004	-0.015	0.017	-0.008	0.088
Number of flower per Inflorescence	0.014	0.008	-0.107	<b>-0.107</b>	-0.045	0.009	0.035	-0.039	0.019	0.089
Number of pod / Inflorescence	-0.071	-0.069	0.076	0.075	<b>0.178</b>	-0.039	-0.021	0.017	-0.048	-0.013
Pod length (cm)	0.063	0.031	-0.016	-0.015	-0.038	<b>0.176</b>	0.009	-0.016	0.084	0.371
Pod width (cm)	-0.018	-0.009	0.025	0.025	0.009	-0.004	<b>-0.076</b>	-0.002	0.001	-0.052
Number of pod per plant	-0.025	-0.027	0.169	0.168	0.044	-0.041	0.012	<b>0.547</b>	-0.174	0.226
Hundred seed weight (g)	0.201	0.180	-0.100	-0.099	-0.148	0.261	-0.006	-0.206	<b>0.461</b>	0.449

Residual value: 0.0839, Diagonal and bold underline figures shows direct effect on pod yield

**Table 2:** Distribution of Sixty three Genotypes of Dolichos bean on the basis of Mahalanobis D<sup>2</sup> statistics

Cluster Number	Number of genotypes included	Genotypes
I	11	IS-05, IS-13, IS-14, IS-15, IS-16, IS-22, IS-25, IS-31, IS-47, IS-53, IS-61.
II	04	IS-02, IS-04, IS-28, IS-38.
III	17	IS-06, IS-07, IS-08, IS-19, IS-21, IS-32, IS-34, IS-36, IS-39, IS-46, IS-49, IS-54, IS-55, IS-56, IS-57, IS-58, Swarna Utkrishti ( St. Check)
IV	11	IS-01, IS-03, IS-09, IS-10, IS-18, IS-20, IS-23, IS-37, IS-40, IS-44, IS-52.
V	05	IS-29, IS-45, IS-48, IS-50, IS-60.
VI	15	IS-11, IS-12, IS-17, IS-24, IS-26, IS-27, IS-30, IS-33, IS-35, IS-41, IS-42, IS-43, IS-59, IS-62, IS-63.

of mean were observed for pod length followed by pod width, length of inflorescence, hundred seed weight, number of flower per inflorescence and number of pods per inflorescence.

The estimate the direct and indirect contribution of various traits towards green pod yield is given in Table 1. Maximum positive direct effect on green pod yield per plant was exhibited by number of pod per plant followed by hundred seed weight, number of pod per inflorescence, pod length and leaf width

In the present study, all the genotypes under study were grouped into six clusters as presented as Table 2. Maximum number of genotypes (17) was retained by cluster III followed by cluster VI (15) genotypes, cluster I and IV almost equal (11) genotypes, cluster V (05) genotypes and cluster II (04) genotypes. Among six cluster the maximum inter cluster distance (D<sup>2</sup> value) was observed between cluster III and I (4.984), followed by cluster III and VI (2.585), cluster III and I (1.998), cluster IV and III (1.617), cluster V and III (1.781) and cluster VI and II (1.420). Ample diversity Dolichos bean within India reported by Baswana

*et al.* (1980), and Golani *et al.* (2007). Which supports our findings. Hence, group constellation showed that IS-02, IS-04, IS-28 and IS-38 were highly divergent from all other genotypes and may be used as parents breeding programme for mobilization of yield barrier in Dolichos bean or may directly be used as a pure line variety for green pod yield and quality characters for Chhattisgarh state, As well as different parts of the country.

## References

- Baswana KS, Pandita ML, Partap PS and Dhankhar BS (1980) Genetic divergence for yield and its components in Indian bean (*Dolichos lablab* var. *lignosus* L.). Haryana J. Hort. Sci. 9 (3/4):, 184-187.
- Borah HK and Khan AKF (2001) Genetic divergence in fodder cowpea (*Vigna unguiculata* (L.) Walp.). Madras Agri. J., 88(10/12): 625-628.
- Golani II, Mehta DR, Naliyandhara Patel, RK and Kanzariya MV (2007) Genetic variability, correlation and path analysis for green pod yield and its characters in Hyacinth bean. *Orissa Journal of Horticulture* 35(1):71-75.
- Rao CR (1952) Advance statistical method in Biometrics Research. John Wiley & Sons, New York.