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Short Communication

Genetic variability and heritability studies in pole type Indian bean (*Lablab purpureus* L. Sweet)

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Indian bean (*Lablab purpureus* L. Sweet) 2n=24 is an important legume Vegetable, cultivated throughout tropics and subtropics mostly for human consumption and animal forage (Rai et al., 2011). Indo-china region being a centre of diversity is endowed with great variability in terms of morphological characters especially growth habit, maturity including shape, size, colour of fruit and seed (Rai. *et al*., 2011). Therefore, knowledge of the available variability within the species for the desired characters enables the breeder in determining the most potential genotype. Burton (1952) also suggested that genetic variability along with heritability should be considered for assessing the maximum and accurate effect of selection. Studies on the genetic variability using genetic parameters like genetic coefficient of variation, heritability and genetic advance is essential for initiating an efficient breeding programme. Accordingly, the present investigation was undertaken to investigate the extent of genetic variability for green pod yield contributing characters in pole type Indian bean.

The study was conducted in Department of Horticulture, Mahatma Phule Krishi Vidyapeeth, Rahuri (M.S.) during the year 2013-14 with thirty seven diverse varieties of pole type Indian bean collected from different part of the Country. The experiment was laid out in Randomized Block Design with three replications having plot size of 5.0x1.5 m. with spacing of 1.0 m. between plants and 1.5 m within row. apart. There were five plants in each replication and for each variety. The plants were trailed on trallies system made up of wodden balli and bamboo poles with iron wire stretched on both sides. The observations on days to first flowering, days to 50 per cent flowering, days to first harvest, length of inflorescence (cm), number of flower inflorescence^{-1}, number of pods inflorescence^{-1}, number of pods vine^{-1}, pod setting (%), pod length (cm), pod width (cm), number of grains pod^{-1}, green pod yield plot^{-1}, and hectare^{-1} were recorded from all the 5 plants in each replication in each variety. Variability existing in different characters were estimated as suggested by Burton (1952). Heritability in the broad sense was estimated by the formula suggested by Hanson *et al.,* (1956). The expected genetic advance of available germplasm at 5% intensity of selection was calculated as per Johnson *et al*.,(1955) using constant 'K' 2.06.

The Data present in Table 1 revealed that maximum variability was noted. In number of pods vine^{-1} ranged from 58.42 to 613.67 indicating maximum variability present which showed great scope for selection among the existing genotypes. Maximum variability in number of pods in Indian bean has also been reported by Rai *et al.,* (2009), which support our findings.

The genotypic coefficient of variation (GCV) was maximum for green pod yield plant^{-1} (54.53) followed by green pod yield plot^{-1} (54.51), plod yield hectare^{-1} (54.50) and number of pods vine^{-1} (48.44). High genotypic coefficient of variation (GCV) for these characters indicated out the possibility of improvement of these characters by selection. Similar trend of variation for these characters were also reported by Das *et al.,* (1987) and Rai et al (2009). Low value of GCV (14.10) for number of pod inflorescence^{-1} indicated that this trait was considerably influenced by environment.

The genotypic coefficient of variation does not offer full scope to estimate the variation that is heritable and therefore, estimation of heritability becomes necessary. Data presented in Table 1 revealed that all characters under study were highly heritable in nature. The estimates of heritability ranged from 57.68 (pod setting percentage) to 98.65 (pod width). High heritability estimates of these characters indicated scope for transferring the characters to the progenies. Similar reports regarding heritability of above said characters of dolichos bean reported by Das

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Table 1. Coefficient of variation, heritability genetic advance and genetic advance as percent of mean for different characters in Dolichos bean genotypes

Sr. No.	Characters	Range	PCV	GCV	Herita-bility (b.s.)	Genetic advance	Expected genetic advance as percent of mean
1.	Days to first flowering	42.33-118.00	22.72	22.51	98.08	40.12	45.92
2.	Days to 50 per cent flowering	46.33-123.33	20.71	20.25	95.61	38.71	40.80
3.	Days to first harvest	62.33-142.00	16.96	16.23	91.66	35.24	32.02
4.	Length of inflorescence (cm)	4.73-32.40	51.29	50.53	97.08	16.63	2.56
5.	Number of flowers inflorescence^{-1}	23.63-45.50	16.97	16.68	96.65	11.34	33.78
6.	Number of pods inflorescence^{-1}	11.50-19.20	14.97	14.10	88.76	3.97	27.37
7.	Number of pods vine^{-1}	58.42-613.67	53.10	48.44	83.24	240.99	91.05
8.	Pod setting (%)	32.87-49.68	9.66	7.34	57.68	5.00	11.48
9.	Pod length (cm)	5.03-18.66	31.82	31.14	95.81	7.12	62.80
10.	Pod width (cm)	1.00-3.69	36.28	36.04	98.65	1.30	73.73
11.	Number of grains pod^{-1}	3.86-6.30	11.88	11.02	86.00	1.06	21.05
12.	Average weight of 10 pods (g)	19.33-150.33	49.57	49.01	97.77	64.58	99.84
13.	Green pod yield plant^{-1} (g)	434.06-4548.82	56.40	54.53	93.49	1629.81	108.62
14.	Green pod yield plot^{-1} (kg)	2.17-22.74	56.38	54.51	93.48	8.14	108.58
15.	Green pod yield ha^{-1} (q)	28.93-303.20	56.41	54.50	93.49	108.66	108.60

et al., (1987) and Rai *et al*., (2009) confirmed the findings of the present investigation.

The genotypic coefficient of variation along with heritability estimates would given clear picture regarding the extent of genetic advance for further selection (Burton, 1952). In the present investigation green pod yield plant^{-1}, pod yield plot^{-1}, pod yield hectare^{-1}, average weight of 10 pods, number of pods vine^{-1} and pod width had high GCV and high heritability. This combination of high heritability along with high genotypic coefficient of variation suggested that the characters would provide greater scope for further selection. These results are in agreement with that reported by Rai *et al*., (2009) in dolichos bean crop.

Johnson *et al*., (1955) suggested that heritability estimate in combination with genetic advance was more reliable than heritability alone for predicting the effect of selection. The estimate of genetic advance as per cent of mean ranged from 2.56 (length of inflorescence) to 108.62 (green pod yield plant^{-1}). These results were in accordance with and Das *et al*., (1987). High heritability associated with high genetic advance is mainly attributed to the action of additive gene (Panse 1957). In the present study high heritability associated with high genetic advance as per cent mean was observed for green pod yield plant^{-1} plot^{-1} hectare^{-1} and average weight of 10 pods which indicated that these characters had additive gene effect and therefore they are improved by effective selection procedure. Similar finding were also reported by Das *et al*., (1987), Rai *et al*., (2009) and Parmer *et al*., (2013). High heritability is not always an indication of high genetic gain (Johnson *et al*., (1955). High heritability (108.62) associated with low genetic advance as percent of mean 2.56 for length of inflorescence might be due to non-additive gene action which include epitasis and dominance (Liang and Walter, 1968).

From the present investigation, it is suggested that pod yield plant^{-1}, pod yield plot^{-1}, pod yield hectare^{-1} and pod width had additive gene effects and therefore, these traits would be more promising to select genotypes for improvement in this crop.

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