



P-ISSN: 2349-8528

E-ISSN: 2321-4902

IJCS 2018; 6(6): 647-648

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Received: 29-09-2018

Accepted: 30-10-2018

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## Genetic variability and association analysis for green pod yield and its contributing characters in winged bean (*Psophocarpus tetragonolobus* L.)

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Ten genotypes of winged bean (including local accessions with a standard check variety) were evaluated for genetic variability and association analysis at Research farm of Indira Gandhi Agricultural University, Raipur during Kharif 2015. The phenotypic coefficient of variation (PCV) was in higher than the genotypic coefficient of variation (GCV). High heritability coupled with high genetic advance as percentage of mean were observed for traits like number of green pods/ plant, green seed yield / plant green pod yield/ plant and 100 green seed weight exhibited that these traits were governed by additive gene effects. Maximum positive significant phenotypic association with green pod yield/ plant was showed by green seeds/ pod (0.94) followed by green seed yield / plant (0.64), pod length (0.75) and days to pod initiation (0.41).

**Keywords:** Accessions, variability, association, winged bean

**Introduction**

Winged bean (*Psophocarpus tetragonolobus* L.) is an important vegetable with high protein content and medicinal value grown in tribal areas of Chhattisgarh. Peoples of tribal areas use the winged bean in their diet in the form of young pods and seeds. For this highly nutritive underutilized (now a day's potential crop) vegetable to be a matter of choice of farmers / consumers its crop improvement must be carried out. For any crop improvement programme, availability and assessment is a prerequisite in this crop. Hence, an attempt was made to estimate variability and association analysis in local accessions of winged bean.

**Materials and Methods:**

Ten local accessions with standard check variety (AKWB-1) were grown in Randomized Block Design with three replications at Research farm of IGKV, Raipur during *Kharif* 2015. Each genotype was sown in four rows. Each plot consists of 4.0 m x 2.4 m. Recommended package of practices were followed. Morphological observations on various traits (table -1) were recorded from five plants of each genotype. The analysis of variance was carried out by Panse and Sukhatme (1967) <sup>[2]</sup> procedure. Association analysis was done by Dewey and Lu (1959) <sup>[1]</sup>.

**Results and Discussion**

The estimates of different variability parameters *viz.* mean, genotypic coefficient of variation (GCV), phenotypic coefficient of variations (PCV) and genetic advance as percentage of mean are given in Table -1. The PCV was in higher magnitude than the corresponding GCV for number of green pods / plant (33.0%), green seed yield / plant (28.36%) and green pod yield / plant (24.26%). The results are in partial agreement with those reported by Singh *et al.*, (2016) <sup>[3]</sup>. Relatively higher magnitude of heritability in broad sense was observed for all characters except green seeds / plant (52.11%). High heritability coupled with high genetic advance as percentage of mean for traits like number of green pods / plant, green seed yield / plant, green pod yield / plant and 100 green seed weight exhibited that these traits were governed by additive gene effects and simple selection can be used for further improvement in these traits in winged bean. These results was in contrary with the results of Singh *et al.*, (2016) <sup>[3]</sup>. The genotypic and phenotypic correlation coefficients among green pod yield / plant and its contributing characters are shown in Table-2.

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In general, it was observed that estimates of genotypic correlation coefficients were higher than the phenotypic correlation coefficients for most of the characters, exhibited a strong inherent correlation of the characters under study with a probable influence of environment on the expression. Among the traits studied, the number of green pod yield / plant (0.94) was found higher significant positive correlation with green seeds / pod. Other traits indicating a highly

significant positive association with green pod yield / plant were green seed yield / plant (0.64), pod length (0.75), days to pod initiation (0.41) at genotypic and phenotypic levels. Green pod yield / plant (0.51) was also exhibited significant correlation with number of green pods / plant (0.51) at genotypic level. Similar findings were also reported by Singh *et al.*, (2016) [3] for green pod yield / plant with days to pod initiation and green seeds / plant.

**Table 1:** Estimates of variability for green pod yield and its contributing traits in winged bean

Traits	Mean	GCV (%)	PCV (%)	H 2 (bs) (%)	G.A. as percentage of mean
Days to flower initiation	65.0	2.49	3.03	82.1	5.12
Days to pod initiation	75.0	2.65	3.42	77.48	5.45
Pod length (cm)	16.4	5.6	7.87	71.15	11.53
Pod width (cm)	2.5	8.49	10.8	78.61	17.48
No. of green pods /plant	20.0	32.9	33.9	97.00	67.73
Green seeds / plant	10.0	5.18	9.94	52.11	10.67
100 green seed weight (g)	34.0	14.22	14.44	98.47	29.29
Green seed yield / plant (g)	45.0	26.51	28.36	93.47	54.62
Green pod yield / plant (g)	200.0	24.23	24.26	99.8	49.87

**Table 2:** Association analysis among green pod yield and its contributing characters in winged bean

Traits		Days of flowering initiation	Days to pod initiation	Pod length	No. of green pods /plant	Pod width	Green Seeds per pod	100 green seed weight	Green seed yield/ plant	Green pod yield / plant
Days of flowering initiation	P	-	0.62	0.26	0.32	0.15	0.15	-0.31	0.21	0.39
	G	-	0.84	0.35	0.49	0.14	0.22	-0.33	0.29	0.48
Days to pod initiation	P		-	0.21	0.66	0.11	0.04	-0.09	0.05	0.41
	G		-	0.45	0.69	0.16	-0.40	-0.10	0.30	0.54
Pod length	P			-	0.86	-0.09	0.05	-0.02	0.03	0.75
	G			-	0.33	-0.16	0.21	-0.02	0.19	0.86
No. of green pods /plant	P				-	0.22	-0.17	0.41	0.16	0.27
	G				-	0.27	-0.14	0.69	-0.12	0.51
Pod width	P					-	0.55	-0.27	0.43	-0.11
	G					-	0.12	-0.13	0.61	-0.18
Green Seeds per pod	P						-	-0.18	-0.09	0.94
	G						-	0.14	-0.07	0.98
100 green seed weight	P							-	0.15	-0.09
	G							-	-0.13	-0.11
Green seed yield/ plant	P								-	0.64
	G								-	0.78
Green pod yield / plant	P									-
	G									-

\* Significant at 1% prob. level

\*\* Significant at 5% prob. Level

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