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## Character association and path analysis in Indian bean (*Lablab purpureus* L.)

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### Abstract

The investigation was carried out at Vegetable Research Station, Junagadh Agricultural University, Junagadh (Gujarat) during late *kharif* 2017- 18 in Randomized Block Design with three replications. The experimental materials comprised of thirty six genotypes and four check varieties. Days to last pickings, number of pickings, number of pods per plant and pod length exhibited highly significant and positive correlations with green pod yield per plant at both genotypic and phenotypic levels. Length of twig showed significant correlations with green pod yield per plant at both genotypic and phenotypic levels. These were the most important attributes, which contributed towards higher pod yield. Number of pickings, number of pods per plant and 10- green pod weight exhibited positive and high direct effect on green pod yield per plant at both genotypic and phenotypic levels. This revealed that for improvement of green pod yield per plant in Indian bean through selection programme, more emphasis should be given to number of pickings, number of pods per plant and 10- green pod weight.

**Keywords:** Character association, path, Indian bean

### Introduction

Indian bean (*Lablab purpureus* L.) is an important leguminous vegetable crop grown throughout the country. Dolichos bean is grown for its edible pods as a food for human consumption or as animal forage or feed. It has great range of variation for the plant and plant pattern among wild species and cultivar all over the country. Although this crop has originated in India but very little work has been carried out for genetic improvement in yield and quality. Knowledge of the inter-relationships of quantitative traits of economic importance with green pod yield per plant and among themselves in prime important for improvement of a complex character like yield through selection. For this purpose, correlation studies are helpful to some extent to the breeder, but they do not take into consideration the cause and effect relationship, which restricts the practical utility of correlation programme.

The technique of path coefficient analysis devised by Wright (1921) and utilized for the first time in plants by Dewey and Lu (1959) [4] in created wheat grass is efficient in separating the total correlation between two variables into direct and indirect effects. This technique could be used to understand the cause of association between two variables and provides sound for selection of superior genotypes from the diverse breeding populations.

### Materials and Methods

The present investigation was carried out to assess the character association and path coefficient analysis in Indian bean (*Lablab purpureus* L.). The experiment was conducted at Vegetable Research Station, Junagadh Agricultural University, Junagadh (Gujarat) during late *kharif* of 2017-18. The experimental material comprised of thirty six genotypes and four check varieties. The 36 genotypes + 4 check varieties of Indian bean were sown on 8<sup>th</sup> September, 2017 in randomized block design with three replications. Five randomly selected plants were considered for different characters *viz.*, days to first flowering, days to 50% flowering, days to first picking, days to last picking, number of pickings, twig length (cm), number of primary branches per plant, number of pods per plant, pod length (cm), pod width (cm), 10- green pod weight (g) and green pod yield per plant (g). Phenotypic and genotypic correlation coefficients for all the pair wise characters were worked out as per Al-Jibouri *et al.* (1958) [1]. Path coefficient analysis were carried out according to the procedure suggested by Dewey and Lu (1959) [4].

## Results and Discussion

### Correlation coefficient

Days to last picking (Chaitanya *et al.* 2014) [2], number of pickings (Pawar and Prajapati, 2013, Ravinaik *et al.* 2014 and Hadvani, 2018) [7, 8, 5], number of pods per plant (Hadvani, 2018, Inamdar, 2014, Pawar and Prajapati, 2013, Ravinaik *et al.* 2014) [7, 6, 8, 5] and pod length (Chaitanya *et al.* 2014, Inamdar, 2014 and Dewangan *et al.* 2018,) [2, 6, 3] exhibited highly significant and positive correlation with green pod yield per plant at both genotypic and phenotypic levels. Length of twig (Pawar and Prajapati, 2013, Ravinaik *et al.*, 2014) [7, 8] showed significant correlation with green pod yield per plant at both genotypic and phenotypic levels. These were the most important attributes which contributed towards higher pod yield (Table 1).

Significant and positive correlation was found among traits *viz.*, days to first flowering with days to 50% flowering, days to first picking and days to last picking; days to 50% flowering with days to first picking; days to first picking with

number of pickings; days to last picking with number of pickings and green pod yield per plant; number of pickings with twig length, number of pods per plant, pod width and green pod yield per plant; twig length with pod width and green pod yield per plant; number of pods per plant with green pod yield per plant; pod length with 10- green pod weight and green pod yield per plant at both genotypic and phenotypic levels.

### Path coefficient analysis

Number of pickings, number of pods per plant (Pawar and Prajapati, 2013, Chaitanya *et al.*, 2014, Hadvani, 2018, Ravinaik *et al.* 2014) [7, 2, 8, 5] and 10-green pod weight (Hadvani, 2018) [5] exhibited positive and high direct effect on green pod yield per plant at both genotypic and phenotypic levels. This revealed that for improvement of green pod yield per plant in Indian bean through selection programme, more emphasis should be given to number of pickings, number of pods per plant and 10- green pod weight (Table 2 & 3).

**Table 1:** Genotypic ( $r_g$ ) and phenotypic ( $r_p$ ) correlation coefficients among 12 characters in 40 genotypes of Indian bean

Characters	Corr	Days to first flowering	Days to 50% flowering	Days to first picking	Days to last picking	No. of pickings	Twig length (cm)	No. of branches per plant	No. of pods per plant	Pod length (cm)	Pod width (cm)	10- green pod weight (g)	Green pod yield per plant (g)
Days to first flowering	$r_g$	1.000	0.8866**	0.4916**	0.4522**	0.0333	0.0866	-0.4100**	0.1466	-0.0128	-0.0483	-0.0376	0.1344
	$r_p$	1.000	0.8350**	0.4507**	0.3842**	0.0446	0.0779	-0.3938**	0.1290	-0.0030	-0.0457	-0.0306	0.1232
Days to 50% flowering	$r_g$		1.000	0.5162**	0.2742	0.2518	0.2523	-0.4519**	0.2534	0.1033	0.1399	-0.0550	0.2827
	$r_p$		1.000	0.4911**	0.2457	0.2407	0.2445	-0.4438**	0.2388	0.1033	0.1284	-0.0514	0.2664
Days to first picking	$r_g$			1.000	0.0659	-0.4301**	0.0946	-0.2915	0.0381	-0.1005	-0.0587	-0.1724	-0.1349
	$r_p$			1.000	0.0759	0.4349**	0.0994	-0.2805	0.0418	-0.0981	-0.0581	-0.1715	-0.1287
Days to last picking	$r_g$				1.000	0.5692**	0.3320*	-0.5643**	0.2830	0.1459	-0.0542	0.0193	0.5527**
	$r_p$				1.000	0.5260**	0.2834	-0.4855**	0.2408	0.1260	-0.0435	0.0203	0.4653**
No. of pickings	$r_g$					1.000	0.4102**	-0.4815**	0.4098**	0.3036	0.3474*	0.0746	0.7589**
	$r_p$					1.000	0.3869**	-0.4649**	0.3916**	0.2911	0.3217*	0.00736	0.7251**
Length of twig (cm)	$r_g$						1.000	-0.4044**	0.2978	0.0968	0.4212**	-0.0711	0.3332*
	$r_p$						1.000	-0.4006**	0.2907	0.0946	0.3217*	0.0736	0.3263*
No. of branches per plant	$r_g$							1.000	-0.2784	-0.1760	-0.3014	0.0828	-0.3988**
	$r_p$							1.000	-0.2703	-0.1730	-0.2949	0.0797	-0.3907**
No. of pods per plant	$r_g$								1.000	-0.1957	-0.0295	-0.7021**	0.5502**
	$r_p$								1.000	-0.1922	-0.0259	-0.6956**	0.5553**
Pod length (cm)	$r_g$									1.000	0.2354	0.5557**	0.3896**
	$r_p$									1.000	0.2267	0.5449**	0.3755**
Pod width (cm)	$r_g$										1.000	0.2638	0.2381
	$r_p$										1.000	0.2507	0.2276
10- green pod weight (g)	$r_g$											1.000	0.1371
	$r_p$											1.000	0.1344
Green pod yield per plant (g)	$r_g$												1.000
	$r_p$												1.000

\*, \*\* Significant at 5% and 1% levels, respectively

**Table 2:** Genotypic path coefficient analysis showing direct (diagonal and bold) and indirect effects of different characters on green pod yield per plant in 40 genotypes of Indian bean

Characters	Days to first flowering	Days to 50% flowering	Days to first picking	Days to last picking	No. of pickings	Twig length (cm)	No. of primary branches per plant	No. of pods per plant	Pod length (cm)	Pod width (cm)	10- green pod weight (g)	Genotypic correlation with green pod yield per plant
Days to first flowering	-0.0541	-0.0722	0.1072	0.0466	0.0132	-0.0065	-0.0132	0.1427	-0.0007	0.0011	-0.0296	0.1344
Days to 50% flowering	-0.0469	-0.0834	0.1125	0.0282	0.0999	-0.0190	-0.0146	0.2465	0.0057	-0.0032	-0.0433	0.2827
Days to first picking	-0.0266	-0.0430	0.2180	0.0068	-0.1707	-0.0071	-0.0094	0.0371	-0.0056	0.0013	-0.1356	-0.1349
Days to last picking	-0.0245	-0.0229	0.0144	0.1030	0.2260	-0.0250	-0.0182	0.2754	0.0081	0.0012	0.0152	0.5527**
No. of pickings	-0.0018	-0.0210	-0.0938	0.0586	0.3907	-0.0309	-0.0155	0.3987	0.0168	-0.0079	0.0587	0.7589**
Twig length (cm)	-0.0047	-0.0210	0.0206	0.0342	0.1628	-0.0752	-0.0130	0.2898	0.0054	-0.0096	-0.0559	0.3332*
No. of primary branches per plant	0.0222	0.0377	-0.0635	-0.0581	-0.1911	0.0304	0.0322	-0.2708	-0.0098	0.0069	0.0652	-0.3988**
No. of pods per plant	-0.0079	-0.0211	0.0083	0.0291	0.1627	-0.0224	-0.0090	0.9730	-0.0108	0.0007	-0.5524	0.5502**
Pod length (cm)	0.0007	-0.0086	-0.0219	0.0150	0.1205	-0.0073	-0.0057	-0.1904	0.0554	-0.0054	0.4372	0.3896**

Pod width (cm)	0.0026	-0.0117	-0.0128	-0.0056	0.1379	-0.0317	-0.0097	-0.0287	0.0130	-0.0228	0.2076	0.2381
10- green pod weight(g)	0.0020	0.0046	-0.0376	0.0020	0.0296	0.0053	0.0027	-0.6831	0.0308	-0.0060	0.7868	0.1371

Residual effect: 0.28

\*, \*\* Significant at 5% and 1% levels, respectively

**Table 3:** Phenotypic path coefficient analysis showing direct (diagonal and bold) and indirect effects of different characters on green pod yield per plant in 40 genotypes of Indian bean

Characters	Days to first flowering	Days to 50% flowering	Days to first picking	Days to last picking	No of pickings	Twig length (cm)	No. of primary branches per plant	No. of pods per plant	Pod length (cm)	Pod width (cm)	10- green pod weight (g)	Phenotypic correlation with green pod yield per plant
Days to first flowering	0.0383	-0.1373	0.1000	-0.0025	0.019	-0.0035	0.0035	0.1284	-0.0002	0.0021	-0.0246	0.1232
Days to 50% flowering	0.0320	-0.1645	0.1089	-0.0016	0.1024	-0.0111	0.0039	0.2377	0.0060	-0.0060	-0.0413	0.2664
Days to first picking	0.0173	-0.0808	0.2218	-0.0005	-0.1851	-0.0045	0.0025	0.0416	-0.0057	0.0027	-0.1379	-0.1287
Days to last picking	0.0147	-0.0404	0.0168	-0.0065	0.2239	-0.0129	0.0043	0.2397	0.0073	0.002	0.0164	0.4653**
No. of pickings	0.0017	-0.0396	-0.0965	-0.0034	0.4257	-0.0176	0.0041	0.3898	0.0168	-0.0151	0.0592	0.7251**
Twig length (cm)	0.0030	-0.0402	0.0221	-0.0018	0.1647	-0.0455	0.0035	0.2893	0.0055	-0.0192	-0.055	0.3263*
No. of primary branches per plant	-0.0151	0.0730	-0.0622	0.0032	-0.1979	0.0182	-0.0088	-0.2690	-0.0100	0.0138	0.0641	-0.3907**
No. of pods per plant	0.0049	-0.0393	0.0093	-0.0016	0.1667	-0.0132	0.0024	0.9953	-0.0111	0.0012	-0.5593	0.5553**
Pod length (cm)	0.0001	-0.017	-0.0218	-0.0008	0.1239	0.0043	0.0015	-0.1913	0.0578	-0.0106	0.4381	0.3755**
Pod width (cm)	-0.0018	-0.0211	-0.0129	0.0003	0.1369	-0.0186	0.0026	-0.0257	0.0131	-0.0468	0.2016	0.2276
10- green pod weight (g)	-0.0012	0.0084	-0.038	-0.0001	0.0313	0.0031	-0.0007	-0.6923	0.0315	-0.0117	0.8041	0.1344

Residual effect: 0.31

\*, \*\* Significant at 5% and 1% levels, respectively

## Conclusion

From the forgoing discussion, it can be concluded that days to last picking, number of pickings, number of pods per plant, pod length, length of twig, 10- green pod weight had positive and significant correlation with green pod yield per plant, while number of pickings, number of pods per plant per plant and 10- green pod weight had direct effects on green pod yield per plant. So, direct selection for these traits would be effective for the improvement in yield of dolichos bean. These were identified as superior yield components. Hence, the genotypes which exhibited better performance for these characters can be used in further improvement of dolichos bean.

## References

- Al-Jibouri HA, Miller PA, Robinson HF. Genotypic and environmental variances in upland cotton cross of interspecific origin. *Agron. J.* 1958; 50:633-635.
- Chaitanya V, Reddy RVSK, Pandravada SR, Sujata M, Kumar AP. Correlation and path coefficient analysis in Dolichos bean (*Dolichos lablab* L.) *Typicusprain* genotypes. *Plant Archives.* 2014; 14(1):537-540.
- Dewangan R, Choyal P, Ramesh ND, Kerketta A, Mathew AM. Correlation coefficient analysis study in Dolichos bean (*Lablab purpureus* L.). *The pharma innovation journal.* 2018; 7(7):721-723.
- Dewey DR, Lu KH. A correlation and path coefficient analysis of components of crested wheat grass seed production. *Agron. J.* 1959; 51:511-518.
- Hadvani JK. Genetic variability, correlation, path coefficient analysis and selection indices in Indian bean. M. Sc. (Agri.) Thesis. Junagaddh Agricultural University, Junagadh, Gujarat, 2018.
- Inamdar AF. Genetic variability studies in pole type dolichos bean (*Lablab purpureus*). M. Sc. (Horti.) Thesis. Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, 2014.

- Pawar RM, Prajapati RM. Genetic variability, correlation and path analysis in Indian bean (*Lablab purpureus* L. Sweet). *Inter. J Agril. Sci.* 2013; 9(2):615-619.
- Ravinaik K, Hanchinamani CN, Patil MG, Imamsaheb SJ. Correlation and path co-efficient analysis in dolichos bean (*Dolichos lablab* L.) genotypes. *Asian J Hort.* 2014; 9(2):396-399.