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Path analysis studies in dolichos bean (*Lablab purpureus* L.)

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Abstract
The investigation was laid out on thirty one genotypes of Dolichos bean (*Lablab purpureus*) in RBD with two replications during *Kharif* 2017 at the Experimental farm of Department of Agril. Botany, VNMKV, Parbhani. The observations was recorded on twelve characters *viz.* Days to first flowering, days to 50% flowering, length of inflorescence (cm), number of flowers per inflorescence, number of pods per inflorescence, days to first pod harvest, pod length(cm), pod width(cm), no of grains per pod, mean pod weight(gm), pod yield per plant(kg), pod yield per ha(q). Green pod yield per plant was significantly and positively direct effect with 50 per cent flowering, length of inflorescence, number of grains per pod, pod yield per hectare and negative direct effect with days to first flowering, number of flowers per inflorescence, number of pods per inflorescence, first pod harvest, pod length, pod width, mean pod weight. Hence direct selection for these traits may lead to the development of high yielding genotypes of dolichos bean.

Keywords: Dolichos bean, path analysis

Introduction
Dolichos bean (*Lablab purpureus* L.) 2n = 22 is one of the most ancient crop among cultivated plants belonging to family leguminosae. Dolichos bean is multipurpose crop grown for pulse, vegetable and forage. It is one of the major sources of protein (3.8 % green pod basis) in the diets of southern states of India. Dolichos bean is mostly confined to peninsular region of India and cultivated to a large extent in Karnataka and adjoining districts of Tamil Nadu, Andhra Pradesh, Maharashtra, Gujarat, Haryana and Karnataka contributes major share accounts 90 per cent in terms of both area and production. In India it is grown on an area of 85000 ha with annual production of 1800 t/ha (Anonymous, 2013) [2].
The genetic variability, characters association and path coefficient are pre-requisite for improvement of any crop for the selection of superior genotypes and improvement of any traits. It is very difficult to judge whether observed variability is heritable or due to environment alone. Path analysis permits the understanding of cause and effect of related characters (Wright, 1921) [9]. Path analysis helps us in partitioning total correlations into direct and indirect contribution thereby suggesting the degree of importance of each of character towards yield. Keeping in view the above facts, the present investigation was planned.

Material and Methods
The experimental material consists of thirty one genotypes of *Lablab purpureus* including one check were sown during *Kharif* 2017 in *Randomized Block Design* with two replications. The experiment was conducted at Experimental farm, Department of Agricultural Botany, VNMKV, Parbhani. The experiment Plot size 1.8 × 9.0 m Spacing 90 X 90 cm, Fertilizers 75:60:30 Kg NPK/ ha. Five plants from each replication were taken for recording observation on 12 characters *viz.* Days to first flowering, Days to 50% flowering, Length of inflorescence (cm), Number of flowers per inflorescence, Number of pods per inflorescence, Days to First pod harvest, Pod length (cm), Pod width (cm), Number of grains per pod, Mean pod weight (gm), Pod yield per plant (kg) and Pod yield per ha(q).

Results and Discussion
Path analysis was carried out at phenotypic and genotypic level considering pod yield per plant as dependent variable and its attributes *viz.*, days to first flowering, days to 50 per cent flowering, Number of flowers per inflorescence, number of pods per inflorescence, days to first pod harvest, number of grains per pods, pod length, pod width and mean pod weight (g) as independent variables.

The results of path coefficient analysis revealed that, days to 50 per cent flowering (0.1116), length of inflorescence (0.0028), Number of grains per pod (0.0036), Pod yield per hectare (0.9939) had positive direct effect on pod yield per plant. While other characters i.e. Days to first flowering (-0.0977), Number of flowers per inflorescence (-0.0031), Number of pods per inflorescence (-0.0016), First pod harvest (-0.0196), Pod length (-0.0029), Pod width (-0.0101), Mean pod weight (-0.0061) had negative direct effect with pod yield. Similar results were obtained for Chattopadyay and Dutta (2011) [4] for positive direct effect of days to 50 per cent flowering, Upadhyay and Mehta (2011) [8] for direct effect of length of inflorescence, Singh *et al*. (2015) [7] for days to 50 per cent flowering and Patil *et al*. (2017) [5] for days to 50 per cent flowering on pod yield. Upadhyay and Mehta (2011) [8] for negative direct effect of number of flower per inflorescence and number of pods per inflorescence, Anburani and Baby Shalini (2013) [1] for days to first pod harvest, pod length and pod width, Chaitanya *et al.* (2014) [3] for days to first flowering and pod length, Sharma *et al*. (2014) for pod length and pod width and Patil *et al.* (2017) [5] for days to first pod harvest and number of flower per inflorescence.

It is concluded that green pod yield per plant was significantly and positively direct effect with days to 50 per cent flowering length of inflorescence, Number of grains per pod, Pod yield per hectare and negative direct effect with Days to first flowering, Number of flowers per inflorescence, Number of pods per inflorescence, First pod harvest, Pod length, Pod width, Mean pod weight. Therefore these characters should be considered in selection criteria for increasing green pod yield per plant.

Table 1: Direct (diagonal) and indirect (above and below diagonal) path effects of different characters towards yield in Dolichos bean.

S. No	Characters		Days to First flowering	Days to 50 per cent flowering	Length of inflorescence	Number of Flowers /inflorescence	Number of Pods /inflorescence	Days to first pod harvest	Pod length	Pod width	Number of grains/ pod	Mean Pod Weight (g)	Pod yield/ ha
1	Days to first flowering	G	-0.097	-0.096	-0.000	0.039	0.028	-0.082	0.032	0.0289	-0.0136	-0.0104	0.0014
		P	-0.083	-0.082	-0.000	0.037	0.023	-0.084	0.029	0.0210	-0.0134	-0.0078	0.0022
2	Days to 50 per cent flowering	G	0.110	0.111	0.001	-0.043	-0.027	0.094	-0.034	-0.0300	0.0176	-0.0106	0.0023
		P	0.099	0.100	0.000	-0.037	-0.023	0.084	-0.029	-0.0210	0.0134	-0.0078	0.0022
3	Length of inflorescence	G	0.000	0.000	0.002	0.001	-0.000	0.000	-0.000	-0.0007	-0.0004	-0.0010	0.0005
		P	0.000	0.000	0.003	0.001	-0.001	0.000	-0.000	-0.0007	-0.0004	-0.0010	0.0005
4	Number of flowers / inflorescence	G	0.001	0.001	-0.001	-0.003	-0.001	0.001	-0.000	0.0009	-0.0005	0.0007	-0.0015
		P	0.002	0.002	-0.002	-0.006	-0.003	0.002	-0.000	0.0016	-0.0009	0.0004	-0.0008
5	Number of pods/ inflorescence	G	0.000	0.000	-0.000	-0.000	-0001	0.000	-0.0005	0.0002	-0.0005	0.0001	-0.0011
		P	0.003	0.003	-0.004	-0.007	-0.014	0.003	-0.0048	0.0013	-0.0040	0.0006	-0.0102
6	Days to first pod harvest	G	-0.016	-0.016	-0.000	0.009	-0.005	-0.019	0.0091	0.0031	-0.0015	0.0056	0.0031
		P	-0.029	-0.029	-0.001	0.015	-0.009	-0.035	0.0156	0.0041	-0.0024	0.0089	0.0052
7	Pod length	G	0.001	0.000	0.000	0.000	-0.001	0.001	-0.0029	-0.0002	-0.0011	0.0012	-0.0013
		P	0.002	0.001	0.000	0.001	-0.002	0.002	-0.0063	-0.0005	-0.0022	0.0026	-0.0027
8	Pod width	G	0.003	0.002	0.002	0.003	0.001	0.001	-0.0007	-0.0101	-0.0005	-0.0017	0.0008
		P	0.000	0.000	0.000	0.000	0.000	0.000	-0.0002	-0.0029	-0.0001	-0.0005	0.0002
9	Number of grains / pod	G	0.000	0.000	-0.000	0.000	0.001	0.000	00013	0.0002	0.0036	-0.0004	0.0008
		P	0.000	0.001	-0.000	0.001	0.002	0.000	00027	0.0003	0.0077	-0.0008	0.0018
10	Mean pod weight	G	-0.000	-0.000	-0.002	-0.000	-0.000	-0.001	0.0025	0.0010	-0.0007	-0.0061	0.0017
		P	-0.000	-0.000	-0.001	-0.000	-0.000	-0.001	0.0016	0.0006	-0.0004	-0.0038	0.0011
11	Pod yield /hec	G	-0.014	0.020	0.163	0.244	0.719	-0.156	0.4351	-0.0756	0.2342	0.2736	0.9939
		P	-0.011	0.021	0.165	0.246	0.717	-0.148	0.4326	-0.0656	0.2310	0.2765	0.9939
12	Pod yield/plant	G	-0.011	0.023	0.163	0.249	0.725	-0.160	0.4416	-0.0822	0.2368	0.2812	1.0012
		P	-0.014	0.020	0.161	0.246	0.711	-0.157	0.4338	-0.0648	0.2332	0.2772	0.9980

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