International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
www.chemijournal.com
IJCS 2020; 8(5): 111-113

Received: 10-07-2020
Accepted: 14-08-2020

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# Path analysis studies of Dolichos bean (*Lablab purpureus* L.) genotypes

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**DOI:** https://doi.org/10.22271/chemi.2020.v8.i5b.10285

**Abstract**
An investigation entitled "Path analysis studies of Dolichos bean (*Lablab purpureus* L.) genotypes" was carried out during 2017-18 for 9 different sowing dates at All India Coordinated Research Project on Vegetable Crops, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra. The experiment was laid out in Randomized Block Design (R.B.D.) with ten pole type genotypes and three replication. The study revealed that number of pods per vine exhibited high positive direct effect on pod yield per hectare followed by average weight of 10 pods, pod setting percent, length of inflorescence, vine length. The association between pod yield and these characters was significant. The direct negative effects on pod yield observed by pod length, number of pods per inflorescence, number of grains per pod, pod width, days to first flowering, days to 50% flowering and days to first picking.

**Keywords:** Pole type genotypes, path analysis, dolichos bean

## Introduction

Dolichos Bean or Hyacinth Bean (*Lablab purpureus* L.) is also called as Indian bean originated in India. It belongs to the family Fabaceae Sub. Family Papilionoideae, having chromosome No. 2n = 22, 24. It is also called bonavist bean, field bean,Egyptian bean, Sem, Wal in Maharashtra and Karnataka state.Lablab is referred to as an 'orphan legume crop'. Orphan crops are also referred to as'underutilized crops' because of their lack of global cultivation and utilization yet have high nutritional qualities, are heat and drought tolerant, and are accessible to less affluent farmers.

India being the center of origin, there is a great range of variability with different plant and pod charac-ters of pole type dolichos bean (*Lab-lab purpureus*var. *typicus*) grown all over the country and that variability can be exploited for evolving a high yielding type. The evaluation of the potentialities of the existing varieties is very essential because it is the genetic diversity of the initial parental material, on which depends the prom-ise for further crop improvement.

India is the centre of diversity of Dolichos and large numbers of indigenous strains are available in India. Although this crop has originated in India but very little work has been done for the genetic improvement of yield and quality. A great range of variation exists for the plant and pod characters amongst the accessions grown all over the country. The success of any breeding programme in general and improvement of specific trait through selection in particular, totally depends upon the genetic variability present in the available germplasm of a particular crop (A.M. Parmar, *et al*, 2013) [3].

Path analysis used to reveal direct and indirect contribution of each character to yield In view of the above facts, the present studies in dolichos bean entitled "Path analysis studies of Dolichos bean (*Lablab purpureus* L.) genotypes" has been carried out.

## Material and Methods

The investigation entitled "Path analysis studies Of Dolichos bean (*Lablab purpureus* L.) genotypes" was carried out during the year 2017-18 for 9 different sowing dates *viz*., 15th June, 15th July,15th August, 15th September, 15th October, 15th November, 15th December, 15thJanuary,15th February. The 10 pole type genotypes were evaluated in a Randomized Block Design (RBD) with three replications for each environment. Each genotype in a row length of 5.0 m with an inter row spacing of 1.5 m and interplant spacing 1.0 m. Following 10 promising genotypes of Dolichos bean pole type was used as experimental material.

1. DOLPVAR -1
2. DOLPVAR -2
3. DOLPVAR-4
4. DOLPVAR- 5
5. DOLPVAR- 6
6. DOLPVAR-7
7. RHR DBP-05
8. RHR DBP- 04
9. Swarna Utkrist
10. Phule Gauri

The land used for experimental layout was fairly uniform with gentle slope. The soil of experimental site was medium black in color with good drainage. The land was brought to a fine tilth by ploughing, clod crushing and two cross harrowings. Irrigations were given as per the requirement. All the agronomic practices and plant protection measures were followed as and when required as per recommendations to raise a good crop.12morphologiccal characters were considered for data collection namely, days to first flowering, days to 50% flowering and days to first picking, number of pods per vine, average weight of 10 pods, pod setting per cent, length of inflorescence, number of grains per pod, vine length.

## Results and Discussion

The path analysis as suggested by Dewey and Lu (1959) [1] was used to reveal direct and indirect contribution of each character to yield. The direct and indirect contribution of all the characters studied, towards pod yield per hectare are presented in Table 1.

### Direct effect

Among the 12 characters studied number of pods per vine (0.56) recorded significantly higher direct effect on pod yield per hectare followed by average weight of 10 pods (0.45), Pod setting per cent (0.38), length of inflorescence (0.04), number of grains per pod (0.02), vine length (0.01). The association between pod yield and all these characters was significant and positive.

Pod length (- 0.01), number of pods per inflorescence (- 0.01), pod width (- 0.03), days to first flowering (- 0.42), days to 50% flowering (- 0.32) and days to first picking (- 0.73) was recorded significantly and association between pod yield and these characters was significant and negative.

### Indirect effect

Days to first flowering showed indirect positive effect on pod width (0.008), number of pods per inflorescence (0.006), number of grains per pod (0.001) and length of inflorescence (0.001).

Days to 50% flowering showed indirect positive effect on pod width (0.008), number of pods per inflorescence (0.006) and number of grains per pod (0.001).

**Table 1:** Path analysis of green pod yield and its attributing characters

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -0.42 | -0.32 | -0.001 | -0.001 | -0.71 | 0.006 | -0.11 | -0.19 | 0.005 | 0.008 | 0.001 | -0.31 | -0.64** |
| 2 | -0.42 | -0.32 | -0.004 | -0.003 | -0.72 | 0.006 | -0.11 | -0.19 | 0.005 | 0.008 | 0.001 | -0.32 | -0.64** |
| 3 | 0.04 | 0.03 | 0.004 | 0.0003 | -0.08 | -0.004 | 0.21 | 0.15 | -0.004 | 0.001 | -0.01 | 0.06 | 0.41** |
| 4 | 0.08 | 0.06 | 0.001 | 0.001 | -0.20 | -0.007 | 0.28 | 0.23 | -0.004 | -0.01 | -0.007 | 0.13 | 0.56** |
| 5 | -0.41 | -0.32 | -0.0005 | -0.0004 | -0.73 | 0.007 | -0.14 | -0.23 | 0.006 | 0.009 | 0.002 | -0.33 | -0.70** |
| 6 | 0.19 | 0.15 | 0.001 | 0.0007 | -0.38 | -0.01 | 0.31 | 0.27 | -0.006 | 0.002 | -0.004 | 0.16 | 0.69** |
| 7 | 0.08 | 0.06 | 0.001 | 0.0007 | -0.18 | -0.008 | 0.56 | 0.26 | -0.002 | -0.0002 | -0.0092 | -0.041 | 0.73** |
| 8 | 0.22 | 0.17 | 0.001 | 0.0008 | -0.45 | -0.01 | 0.38 | 0.38 | -0.007 | -0.009 | -0.007 | 0.25 | 0.93** |
| 9 | 0.13 | 0.10 | 0.012 | 0.0004 | -0.27 | -0.006 | 0.08 | 0.17 | -0.01 | -0.001 | 0.001 | 0.23 | 0.43** |
| 10 | 0.10 | 0.08 | -0.0001 | 0.0004 | -0.20 | 0.0008 | 0.003 | 0.10 | -0.0005 | -0.03 | -0.006 | 0.18 | 0.23** |
| 11 | 0.02 | 0.01 | 0.0006 | 0.0004 | 0.68 | 0.002 | 0.22 | 0.13 | 0.0008 | -0.01 | 0.02 | 0.009 | 0.30** |
| 12 | 0.29 | 0.23 | 0.001 | 0.00004 | -0.53 | -0.005 | -0.05 | 0.21 | -0.008 | -0.01 | -0.01 | 0.45 | 0.58** |
| 13 | | | | | | | | | | | | | 1.00 |

*, ** Indicates significant at 5% and 1% level of significance.

1. Days to first flowering
2. Days to 50% flowering
3. Length of inflorescence
4. Vine length (cm)
5. Days to first picking
6. No of pods per inflorescence
7. Number of pods per vine 8. Pod setting %
8. Pod length (cm)
9. Pod width (cm)
10. Number of grains per pod
11. Average weight of 10 pods
12. Green pod yield per hector

Length of inflorescence showed indirect positive effect on number of pods per vine (0.21), pod setting % (0.15), average wt of 10 pods (0.06), days to first flowering (0.04), days to 50% flowering (0.03), pod width (0.001) and vine length (0.003).

Vine length showed indirect positive effect on number of pods per vine (0.28), pod setting per cent (0.23), average weight of 10 pods (0.13), days to first flowering (0.08), days to 50% flowering (0.06) and length of inflorescence (0.001).

Days to first picking showed indirect positive effect on pod width (0.009), number of pods per inflorescence (0.007), pod length (0.006) and number of grains per pod (0.002).

Number of pods per inflorescence showed indirect positive effect on number of pods per vine (0.31), pod setting per cent (0.27), average weight of 10 pods (0.16), days to first flowering (0.19), days to 50% flowering (0.15), pod width (0.002), length of inflorescence (0.001) and vine length (0.0007).

Number of pods per vine showed indirect positive effect on pod setting per cent (0.26), days to first flowering (0.08), days to 50% flowering (0.08), length of inflorescence (0.001) and vine length (0.0007).

Pod setting per cent showed indirect positive effect on number of pods per vine (0.38), average weight of 10 pods (0.25), days to first flowering (0.22), days to 50% flowering (0.17), length of inflorescence (0.001) and vine length (0.0008).

Pod length showed indirect positive effect on average wt of 10 pods (0.23), pod setting per cent (0.17), days to first flowering (0.13), days to 50% flowering (0.10), length of inflorescence (0.012) and vine length (0.0004), number of pods per vine (0.08) and number of grains per pod (0.001).

Pod width showed indirect positive effect on average wt of 10 pods (0.18), pod setting per cent (0.10), days to first flowering (0.10), days to 50% flowering (0.08), vine length (0.0004), number of pods per vine (0.003) and number of pods per inflorescence (0.0008).

Number of pods per inflorescence showed indirect positive effect on all characters except pod width.

Average weight of 10 pods showed indirect positive effect on pod setting per cent (0.21) days to first flowering (0.29), days to 50% flowering (0.23), vine length (0.0004) and length of inflorescence (0.001).

Selection of plants for yield is based on any of its components related to each other. Path coefficient analysis is simply a standardised partial regression coefficient, which splits the correlation coefficient into direct and indirect effects. In present investigation path analysis was worked out by following Dewey and Lu (1959) [1] to estimate the magnitude and direction of direct and indirect effects of various yield and yield contributing characters. If the correlation between a casual factor and direct effect is more or less of equal magnitude, indicating the true and perfect relationship between the traits and direct selection through these will be rewarding. However, if the correlation coefficient is positive and the direct effect is negative or negligible, the indirect casual factors are to be considered in simultaneous selection.

The characters number of pods per vine, average weight of 10 pods, Pod setting %, length of inflorescence, vine length recorded high magnitude of direct effect accomplished by highly significant correlation in the desired direction with pod yield per hectare indicating true and direct relationship between these characters, suggesting direct selection based on these characters would help in selecting the high yielding genotypes of dolichos bean. The results were in agreement with the earlier findings of Singh *et al.* (1979) [4] for number of seeds per pod; Singh *et al.* (1985) [5] for length of pod and Kabir and Sen (1989) [2] for number of seeds per pod.

## Conclusion

Path analysis revealed that number of pods per vine exhibited high positive direct effect on pod yield per hectare followed by average weight of 10 pods, pod setting percent, length of inflorescence, vine length. The association between pod yield and these characters was significant. The direct negative effects on pod yield observed by pod length, number of pods per inflorescence, number of grains per pod, pod width, days to first flowering, days to 50% flowering and days to first picking. Genotypes used in breeding programme for the above characters exhibiting positive direct and indirect effects with correlation.

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