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## Correlation studies in dolichos bean (*Lablab purpureus* L.)

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### Abstract

Present research was carried out at Experimental farm of Department of Agril. Botany, VNMKV, Parbhani during *Kharif* 2017. The experimental material comprised of thirty one genotypes of dolichos bean and the experiment was laid out in Randomized Block Design with two replications. 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). It was observed that marketable pod yield per plant had exhibited highly significant positive association with number of pod per inflorescence, pod length and mean pod weight. Direct selection based on these traits could result in simultaneous improvement of aforesaid traits and marketable pod yield in Dolichos bean.

**Keywords:** Dolichos bean, correlation

### Introduction

Dolichos bean or Hyacinth bean or Egyptian bean or Sem (*Lablab purpureus* L.) is an important legume vegetable crop throughout India. It belongs to the family Fabaceae, sub family Faboideae, tribe phaseoleae and sub tribe phaseolineae. Dolichos bean has chromosome number  $2n=2x=22$ . 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 percent 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].

Correlation analysis provides information on the nature and magnitude of the association of different component characters with pod yield. It also helps us to understand the nature of inter-relationship among the component traits themselves. Ultimately this kind of analysis could help the breeder to design selection strategies to improve pod yield. In the present investigation, both genotypic and phenotypic correlations were worked out for yield and its contributing characters.

### 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)

**Table 1:** Estimation of genotypic and phenotypic correlation coefficients for different characters of Dolichos bean

| Character                         |   | Days to first flowering | Days to 50 percent flowering | Length of inflorescence | Number of flowers / inflorescence | Number of pods per inflorescence | Days to first pod harvest | Pod length | Pod width | Number of grains per pod | Mean pod weight (g) | Pod yield/ plant | Pod yield/ ha |
|-----------------------------------|---|-------------------------|------------------------------|-------------------------|-----------------------------------|----------------------------------|---------------------------|------------|-----------|--------------------------|---------------------|------------------|---------------|
| Days to first flowering           | G | 1.00                    | 0.992**                      | 0.008                   | -0.404                            | -0.292*                          | 0.847**                   | -0.334*    | -0.296    | 0.139                    | -0.170              | -0.011           | -0.014        |
|                                   | P | 1.00                    | 0.990**                      | 0.004                   | -0.383                            | -0.276*                          | 0.842**                   | -0.316*    | -0.229    | 0.110                    | -0.860              | -0.086           | -0.011        |
| Days to 50 percent flowering      | G |                         | 1.00                         | 0.009                   | -0.387**                          | -0.244                           | 0.846**                   | -0.305*    | -0.268    | 0.157                    | -0.095              | 0.023            | 0.020         |
|                                   | P |                         | 1.00                         | 0.003                   | -0.369**                          | -0.233                           | 0.839**                   | -0.289*    | -0.208    | 0.132                    | -0.077              | 0.020            | 0.021         |
| Length of inflorescence           | G |                         |                              | 1.00                    | 0.379**                           | 0.325**                          | 0.041                     | -0.130     | -0.247    | -0.139                   | -0.361**            | 0.163            | 0.164         |
|                                   | P |                         |                              | 1.00                    | 0.385**                           | 0.332**                          | 0.046                     | -0.126     | -0.229    | -0.120                   | -0.341**            | 0.161            | 0.164         |
| Number of flowers / inflorescence | G |                         |                              |                         | 1.00                              | 0.510**                          | -0.461**                  | 0.156      | -0.302*   | 0.159                    | -0.117              | 0.249            | 0.246         |
|                                   | P |                         |                              |                         | 1.00                              | 0.511**                          | -0.434**                  | 0.157      | -0.276*   | 0.156                    | -0.112              | 0.246            | 0.246         |
| Number of pods/ inflorescence     | G |                         |                              |                         |                                   | 1.00                             | -0.303*                   | 0.341**    | -0.097    | 0.286*                   | -0.051              | 0.725**          | 0.724**       |
|                                   | P |                         |                              |                         |                                   | 1.00                             | -0.277*                   | 0.337**    | -0.091    | 0.280*                   | -0.042              | 0.711**          | 0.715**       |
| Days to first pod harvest         | G |                         |                              |                         |                                   |                                  | 1.00                      | -          | -0.157    | 0.075                    | -0.284*             | -0.160           | -0.157        |
|                                   | P |                         |                              |                         |                                   |                                  | 1.00                      | -          | -0.117    | 0.068                    | -0.253*             | -0.157           | -0.147        |
| Pod length                        | G |                         |                              |                         |                                   |                                  |                           | 1.00       | 0.065     | 0.372**                  | 0.412**             | 0.441**          | 0.437**       |
|                                   | P |                         |                              |                         |                                   |                                  |                           | 1.00       | 0.075     | 0.349**                  | 0.413**             | 0.433**          | 0.431**       |
| Pod width                         | G |                         |                              |                         |                                   |                                  |                           |            | 1.00      | 0.047                    | 0.170               | -0.082           | -0.076        |
|                                   | P |                         |                              |                         |                                   |                                  |                           |            | 1.00      | 0.041                    | 0.160               | -0.064           | -0.065        |
| Number of grains/pod              | G |                         |                              |                         |                                   |                                  |                           |            |           | 1.00                     | -0.111              | 0.236            | 0.235         |
|                                   | P |                         |                              |                         |                                   |                                  |                           |            |           | 1.00                     | -0.105              | 0.233            | 0.230         |
| Mean pod weight                   | G |                         |                              |                         |                                   |                                  |                           |            |           |                          | 1.00                | 0.281*           | 0.275*        |
|                                   | P |                         |                              |                         |                                   |                                  |                           |            |           |                          | 1.00                | 0.277*           | 0.275*        |
| Pod yield / plant                 | G |                         |                              |                         |                                   |                                  |                           |            |           |                          |                     | 1.00             | 1.001**       |
|                                   | P |                         |                              |                         |                                   |                                  |                           |            |           |                          |                     | 1.00             | 0.998**       |
| Pod yield / ha                    | G |                         |                              |                         |                                   |                                  |                           |            |           |                          |                     |                  | 1.00          |
|                                   | P |                         |                              |                         |                                   |                                  |                           |            |           |                          |                     |                  | 1.00          |

## Results and Discussion

Correlation analysis provides information on the nature and magnitude of the association of different component characters with pod yield. It also helps us to understand the nature of inter-relationship among the component traits themselves.

This trait recorded positive significant association with pod yield per hectare (1.001<sub>r<sub>g</sub></sub>, 0.998<sub>r<sub>p</sub></sub>), number of pods per inflorescence (0.725<sub>r<sub>g</sub></sub>, 0.711<sub>r<sub>p</sub></sub>) and pod length (0.441<sub>r<sub>g</sub></sub>, 0.433<sub>r<sub>p</sub></sub>) at both levels of significance. It also showed positive significant correlation with mean pod weight (0.281<sub>r<sub>g</sub></sub>, 0.277<sub>r<sub>p</sub></sub>) at 5% level of significance only (Table 1.).

Days to first flowering recorded high positive, significant correlation with days to 50 percent flowering (0.992<sub>r<sub>g</sub></sub>, 0.990<sub>r<sub>p</sub></sub>), days to first harvest (0.847<sub>r<sub>g</sub></sub>, 0.842<sub>r<sub>p</sub></sub>) at 5% and 1% levels of significance. Days to first flowering recorded negative, significant correlation with Number of flowers per inflorescence (-0.404<sub>r<sub>g</sub></sub>, -0.383<sub>r<sub>p</sub></sub>), at both levels of significance. This character exhibited negative significant correlation with number of pods per inflorescence (-0.292<sub>r<sub>g</sub></sub>, -0.276<sub>r<sub>p</sub></sub>) and pod length (-0.334<sub>r<sub>g</sub></sub>, -0.316<sub>r<sub>p</sub></sub>) at 5% level of significance only.

Days to 50 percent flowering recorded high positive, significant correlation with days to first harvest (0.846<sub>r<sub>g</sub></sub>, 0.839<sub>r<sub>p</sub></sub>) at 5% and 1% levels of significance. Days to 50 percent flowering recorded negative, significant correlation with Number of flowers per inflorescence (-0.387<sub>r<sub>g</sub></sub>, 0.369<sub>r<sub>p</sub></sub>), at both levels of significance. This character exhibited negative significant correlation with pod length (-0.305<sub>r<sub>g</sub></sub>, -0.289<sub>r<sub>p</sub></sub>) at 5% level of significance only.

Length of inflorescence recorded positive significant association with Number of flowers per inflorescence (0.379<sub>r<sub>g</sub></sub>, 0.385<sub>r<sub>p</sub></sub>) and number of pods per inflorescence (0.325<sub>r<sub>g</sub></sub>, 0.332<sub>r<sub>p</sub></sub>) at 5% and 1% levels of significance. This

character exhibited negative significant correlation with mean pod weight (-0.361<sub>r<sub>g</sub></sub>, -0.341<sub>r<sub>p</sub></sub>) at both level of significance. Number of flowers per inflorescence registered positive significant correlation with number of pod per inflorescence (0.510<sub>r<sub>g</sub></sub>, 0.511<sub>r<sub>p</sub></sub>) at both 5% and 1% levels of significance. This character exhibited negative significant correlation with days to first pod harvest (-0.461<sub>r<sub>g</sub></sub>, -0.434<sub>r<sub>p</sub></sub>) at both 5% and 1% level of significance.

Number of pods per inflorescence exhibited high significant positive association with pod yield per plant (0.725<sub>r<sub>g</sub></sub>, 0.711<sub>r<sub>p</sub></sub>) and pod yield per hectare (0.724<sub>r<sub>g</sub></sub>, 0.715<sub>r<sub>p</sub></sub>) at both levels whereas, pod length (0.341<sub>r<sub>g</sub></sub>, 0.337<sub>r<sub>p</sub></sub>) showed significant positive correlation with at both 5 percent and 1% level of significance. This character exhibited positive significant correlation with number of grain per pod (0.286<sub>r<sub>g</sub></sub>, 0.280<sub>r<sub>p</sub></sub>) at 5% levels of significance only. This character exhibited negative significant correlation with days to first harvest (-0.303<sub>r<sub>g</sub></sub>, -0.277<sub>r<sub>p</sub></sub>) at 5% level of significance only.

The character days to first pod harvest exhibited negative and significant correlation with pod length (-0.466<sub>r<sub>g</sub></sub>, -0.445<sub>r<sub>p</sub></sub>) at both 5% and 1% levels of significance. This character exhibited negative and significant correlation with mean pod weight (-0.284<sub>r<sub>g</sub></sub>, -0.253<sub>r<sub>p</sub></sub>) at 5% level of significance only.

Pod length exhibited significant positive correlation with pod yield per plant (0.441<sub>r<sub>g</sub></sub>, 0.433<sub>r<sub>p</sub></sub>), mean pod weight (0.412<sub>r<sub>g</sub></sub>, 0.413<sub>r<sub>p</sub></sub>) and number of grains per pod (0.372<sub>r<sub>g</sub></sub>, 0.349<sub>r<sub>p</sub></sub>) at both 5% and 1% levels of significance.

Pod width exhibited significantly negative association with Number of flowers per inflorescence (-0.302<sub>r<sub>g</sub></sub>, -0.276<sub>r<sub>p</sub></sub>) at both 5% levels of significance.

This trait exhibited positive significant correlation with pod length (0.372<sub>r<sub>g</sub></sub>, 0.349<sub>r<sub>p</sub></sub>) at 5 and 1% levels of significance. This character also exhibited positive correlation with number

of pods per inflorescence ( $0.286r_g$ ,  $0.280r_p$ ) at 5% level of significance only.

Mean pod weight displayed significant positive correlation with pod yield per plant ( $0.281r_g$ ,  $0.277r_p$ ) at 5% level of significance only.

In respect of this character, positive significant association with number of pods per inflorescence ( $0.724r_g$ ,  $0.711r_p$ ) and pod length ( $0.437r_g$ ,  $0.431r_p$ ) at both levels of significance. It also showed positive significant correlation with mean pod weight ( $0.275r_g$ ,  $0.275r_p$ ) at 5% level of significance only.

Uddin and Newaz (1997) <sup>[9]</sup>, Basavarajappa and Byre gowda (2004), Upadhyay and Mehta (2011) <sup>[10]</sup>, Magalingam *et al.* (2013) <sup>[5]</sup>, Asaduzzaman *et al.* (2014) <sup>[1]</sup>, Chaitanya *et al.* (2014) <sup>[3]</sup>, Sharma *et al.* (2014) <sup>[7]</sup>, Singh *et al.* (2015) <sup>[8]</sup>, Verma *et al.* (2015) <sup>[11]</sup>, Choudary *et al.* (2016) <sup>[4]</sup> and Patil *et al.* (2017) <sup>[6]</sup>.

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