Path co-efficient analysis in dolichos bean

[Dolichos lablab (Roxb.) L. var. typicus]

A. ANBURANI AND T. BABY SHALINI

ABSTRACT: An investigation was conducted at Vegetable unit, Department of Horticulture, Faculty of Agriculture, Annamalai University, Chidambaram during 2011-12, with a view to identify superior genotypes in garden bean. The experiment was laid out by collecting 27 genotypes from various sources in a randomized block design with three replications for two seasons. The observations on various growth and yield parameters were recorded and analyzed for identifying the superior genotype. Path analysis revealed the existence of high magnitude of positive direct effect of pod weight, number of pods per inflorescence, number of branches per plant on yield of pods per plant in season I. In season II, the traits like pod weight, number of branches per plant, number of days taken for fruit setting and number of pods per plant had highly significant and positive direct effect on yield of pods in season II.

KEY WORDS: Dolichos bean, Direct effect, Indirect effect, Growth and yield characters, Path analysis

remaining 17 were collected from different districts viz., Cuddalore (4 local genotypes), Villupuram (3 local genotype), Theni (1 local genotype), Salem (1 local genotype), Kerala (2 local genotypes), Andhra (1 local genotype), Trivannamalai (1 local genotype), Thanjavur (1 local genotype), Trichy (1 local genotype), Karnataka (1 local genotype) and Coimbatore (1 local genotype). The main field was prepared into plots of 2 m x 2 m size and the seeds were sown at spacing 60 cm x 60 cm, respectively. The required intercultural operation and plant protection measures were carried out as per the requirement of the crop. Observations were recorded on various characters viz., plant height, number of branches per plant, days to 50% flowering, number of racemes per plant, raceme length, number of nodes per plant, number of days taken for fruit set, number of pods per inflorescence, number of pods per plant, days to first pod harvest, pod length, pod width, pod weight and pod yield per plant.

The direct and indirect contribution of various characters to yield were calculated through path co-efficient analysis as suggested by Wright (1921) and elaborated by Dewey and Lu (1959).

**RESEARCH FINDINGS AND DISCUSSION**

Path analysis helps in measuring the direct effect of each trait as well as its indirect effect through other characters contributing to yield. This analysis was used in the present investigation by partitioning the direct and indirect effects that contribute to yield. The data on direct and indirect effects of various yield contributing characters are presented in Table 1 and 2 for both seasons.

Among the direct effect on yield, number of pods per inflorescence showed the highest positive direct effect in season I (Table 1). The direct effect on yield in season II (Table 2) is with plant height, number of branches per plant followed by number of pods per plant and number of pods per inflorescence. This is in agreement with the findings of Bendale et al. (2004), Bendale et al. (2008) and Rai et al. (2009) for pod weight; Shinde and Dumbre (2010) and Rafi and Nath (2004) for pod yield per plant; Rai et al. (2008) and Upadhyay and Mehta (2010) in dolichos bean.

The characters viz., raceme length, number of flower buds per raceme, number of nodes per plant, number of pods per plant and days to first pod harvest, pod length and pod width in season I showed marked negative direct effect on pod yield per plant. In season II, the negative direct effect was on pod yield per plant, plant height, number of racemes per plant, raceme length, number of nodes per plant, number of flower buds per inflorescence and pod length. This is in agreement with the results of Upadhyay and Mehta (2010) in Dolichos bean. Similar findings were also reported by Rai et al. (2008) and Kamaluddin and Shahid Ahmed (2011) in common bean.

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**Table 1:** Path co-efficient analysis depicting the direct (B) and indirect effect of various characters on yield per plant in dolichos bean (Season I)

<table>
<thead>
<tr>
<th>Characters</th>
<th>Plant height (cm)</th>
<th>No. of Branches per plant</th>
<th>Days to 50% flowering (days)</th>
<th>No. of Racemes per plant</th>
<th>Raceme Length (cm)</th>
<th>No. of nodes per plant</th>
<th>No. of flower buds per raceme</th>
<th>No. of pods per inflorescence</th>
<th>No. of pods per plant</th>
<th>Days to first pod harvest (days)</th>
<th>Pod length (cm)</th>
<th>Pod width (cm)</th>
<th>Pod yield (g)</th>
<th>Residual effect (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.153</td>
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<td>-0.246</td>
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<td>0.014</td>
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<td>Plant height (cm)</td>
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<td>0.030</td>
<td>0.028</td>
<td>-0.014</td>
<td>0.008</td>
<td>0.014</td>
<td>0.017</td>
<td>0.012</td>
</tr>
</tbody>
</table>

**Table 2:** Path co-efficient analysis depicting the direct (B) and indirect effect of various characters on yield per plant in dolichos bean (Season II)

<table>
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<tr>
<th>Characters</th>
<th>Plant height (cm)</th>
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<th>Days to 50% flowering (days)</th>
<th>No. of Racemes per plant</th>
<th>Raceme Length (cm)</th>
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<th>No. of flower buds per raceme</th>
<th>No. of pods per inflorescence</th>
<th>No. of pods per plant</th>
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Although pod weight had the highest direct effect on pod yield per plant, the indirect effect was found to be positive via plant height, number of branches per plant, number of nodes per plant, number of days taken for fruit setting, number of pods per inflorescence, number of pods per plant, days to first pod harvest, pod length and pod width. Similarly the positive significant effect due to number of pods per inflorescence might have played indirectly by influencing the characters like plant height, number of branches per plant, number of racemes per plant and days to first pod harvesting in season I.

In season II, the number of branches per plant had the highest direct effect on pod yield per plant, the indirect effect was found to be positive via number of days taken for fruit setting, number of pods per plant, days to first pod harvest and pod length. Similarly the positive significant effect due to number of pods per plant might have played indirectly by influencing the characters like number of branches per plant, number of days taken for fruit setting, days to first pod harvest, pod length and pod width.

Even though the direct effect due to raceme length was negative it had indirectly the yield by having positive indirect effect on plant height, number of branches per plant, number of raceme per plant, number of flower buds per raceme, number of pods per plant, days to first pod harvest. The similar trend was observed in case of flower buds per raceme which had influenced the yield per plant mainly through its indirect effect on plant height, number of branches per plant, number of racemes per plant, raceme length, number of flower buds per raceme, number of nodes per plant, number of days taken for fruit setting, number of pods per inflorescence, days to first pod harvest, pod length and pod width in season I.

In season II, the direct effect due to plant height was negative, it had indirectly the yield by having positive individual effect on number of branches per plant, raceme length, number of days taken for fruit setting, number of pods per plant, days to first pod harvest and pod length. The similar trend was observed in case of raceme length which had influenced the yield per plant mainly through its indirect effect on plant height, number of branches per plant, number of racemes per plant, raceme length, number of flower buds per raceme, number of nodes per plant, number of days taken for fruit setting, number of pods per plant, days to first pod harvest, pod length and pod width. Similar findings were also reported by Thankur et al. (1997) and Priyanka (2011) in dolichos bean.

Improvement in dolichos bean thus may be enhanced through the direct selection of genotypes (to be used in breeding programme) for the above mentioned characters exhibiting high positive direct and indirect effects with positive correlation.
REFERENCES


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