GENETIC VARIABILITY, HERITABILITY AND GENETIC ADVANCE ANALYSIS IN SEGREGATING GENERATION OF BLACKGRAM (VIGNA MUNGO (L.) HEPPER)

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ABSTRACT

The genetic variability study was carried out in the segregating populations of three crosses. The cross LBG 645/LBG 20 recorded high estimates of PCV and GCV for plant height, number of branches per plant, number of seeds per pod and seed yield per plant. High heritability coupled with high genetic advance as per cent of mean were observed for plant height, number of branches per plant, number of clusters per plant and number of pods per plant. Number of pods per cluster recorded high heritability and high genetic advance in LBG 685/LBG 20. High heritability with high genetic advance for pod length in LBG 645/LBG 20.

INTRODUCTION

The development of new varieties is mainly governed by the magnitude of genetic variability in the base material and extent of variability for the desired characters. Genetic diversity is the basic requirement for successful breeding programme. The more diverse parent, greater the changes of increased spectrum of variability. Thus, the present study was carried out to assess the variability with help of genetic parameters like coefficient of variability, heritability and genetic advance among different characters.

MATERIAL AND METHODS

The materials selected for the study consisted of F2 populations of three crosses involving four parents namely LBG 402, LBG 685, IBG 645 and LBG 20. The study was carried out at plant breeding farm, Annamalai University, Annamalainagar during rabi 2001. Each of the F2 population was raised with the spacing of 30 cm x 15 cm and recommended cultural practices were followed. Two hundred plants were selected in each cross combination. Observations were recorded on nine metric characters namely, plant height (m), branches, clusters, pods/cluster, pods, pod length, seeds/pod, hundred seed weight (g) and seed yield (g) on single plant basis. The data were estimated, as per the standard procedure.

RESULTS AND DISCUSSION

In general, PCV and GCV showed a wide spectrum of variability in most of the characters studied (Table 1). The GCV depends on the heritable part of variability and therefore it is regarded to be more useful for the assessment of inherent or real variability. The cross LBG 645/LBG 20 recorded high estimates of PCV and GCV for plant height, number of branches per plant, number of seeds per pod and seed yield per plant. The magnitude of PCV in general, was higher than GCV indicating greater influence of environment. The closes values of PCV and GCV indicated less influence of environment. The above results were in consonance with the results of Byregowda et al. (1997).

The method of Panse and Sukhatme (1961) was used for the analysis of variance, Chaudhary and Prasad (1968) and Sivasubramanian and Menon (1973) for genotypic and phenotypic co-efficient of variation, Robinson (1966) and Johanson (1955) for heritability and genetic advance.

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Higher estimates of GCV assured that the chance of combining all the characters together in an individual is very high. Hence selection can be attempted to sort out an ideal plant for improvement of seed yield in
Table 1. Estimates of genetic parameters for nine characters in blackgram

<table>
<thead>
<tr>
<th>Characters</th>
<th>LBG 402 x LBG 685</th>
<th>LBG 645 x LBG 20</th>
<th>LBG 685 x LBG 20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phenotypic variance</td>
<td>Genotypic variance</td>
<td>PCV (%)</td>
</tr>
<tr>
<td>Plant height</td>
<td>109.93</td>
<td>103.11</td>
<td>18.79</td>
</tr>
<tr>
<td>Number of branches per plant</td>
<td>0.62</td>
<td>0.42</td>
<td>27.55</td>
</tr>
<tr>
<td>Number of clusters per plant</td>
<td>44.31</td>
<td>41.74</td>
<td>43.10</td>
</tr>
<tr>
<td>Number of pods per cluster</td>
<td>0.71</td>
<td>0.36</td>
<td>25.51</td>
</tr>
<tr>
<td>Number of pods per plant</td>
<td>207.81</td>
<td>169.10</td>
<td>34.23</td>
</tr>
<tr>
<td>Number of seeds per pod</td>
<td>1.43</td>
<td>0.60</td>
<td>22.71</td>
</tr>
<tr>
<td>Pod length</td>
<td>0.43</td>
<td>0.23</td>
<td>17.25</td>
</tr>
<tr>
<td>100 seed weight</td>
<td>0.16</td>
<td>0.09</td>
<td>8.40</td>
</tr>
<tr>
<td>Seed yield per plant</td>
<td>21.99</td>
<td>11.71</td>
<td>50.09</td>
</tr>
</tbody>
</table>

High GCV was observed for number of branches per plant, number of clusters per plant, number of pods per plant and seed yield per plant. High GCV in the population could be exploited in the selection programme. Sood and Gartan (1994) have also reported the similar results.

High heritability coupled with high genetic advance as per cent of mean were observed for plant height, number of branches per plant, number of clusters per plant and number of pods per plant (Table 2). These results were on par with the reports of Choulwar et al. (1997). It indicated the greater scope for successful selection as these traits could be under the influence of additive gene action.

Number of pods per cluster recorded high heritability with high genetic advance as per cent of mean (LBG 685/LBG 20), hence it could be inferred that simple selection will be effective for this trait. High heritability with high genetic advance for number of seeds per pod in LBG 645/LBG 20. Whereas LBG 402/LBG 685 reported moderate heritability accompanied with moderate genetic advance as per cent of mean. The cross LBG 685/LBG 20 recorded low heritability with low genetic advance as per cent of mean. Hence, selection for such traits may not be rewarding. Some modified selection methods such as progeny testing methods could be applied to
Regarding the pod length, cross LBG 645/LBG 20 recorded high heritability with high genetic advance as per cent of mean. The other two crosses recorded moderate heritability accompanied with low genetic advance as per cent of mean. It indicated the pressure of non-additive gene action. The heritability is being exhibited due to favourable influence of environment rather than genotypes and selection for such traits may not be rewarding.

All three crosses recorded moderate heritability with high genetic advance as per cent of mean for seed yield per plant. It revealed that this traits is governed by additive gene effects. Hence selection may be effective in such cases. This is in accordance with the work of Loganathan (1998).

The result of the present investigation indicate that selection would be effective for plant height, number of branches per plant, number of clusters per plant, number of pods per plant and seed yield per plant which showed high to moderate heritability associate with high genetic advance as per cent of mean estimates.

From the foregoing discussion of heritability and genetic advance, it is understood that LBG 645/LBG 20 is considered as superior cross as it recorded high estimates for seed yield per plant indicating the sizable improvement. So selection on elite line with high yield potential is therefore possible future generation.

REFERENCES