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# CORRELATION AND PATH ANALYSIS IN RICE FALLOW BLACKGRAM (*Vigna mungo*)

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## ABSTRACT

Twenty five genotypes of blackgram were studied for assissing the association between yield and component characters. A significant positive association existed between seed yield, plant height and pod number. The path analysis showed that plant height and pod number have a high direct effect. Besides, plant height exhibited indirect positive effect via pod number, seed number per pod and 100 seed weight.


KEY WORDS : Rice fallow Blackgram, Correlation, Path analysis

Blackgram is one of the important grain legumes of India. However the productivity is very low. To develop elite genotypes, knowledge on interralationship among yield and its component characters and their direct and indirect contribution towards yield is important. Thus it becomes imperative to seek information on the magnitude of association, direct and indirect influence, between yield and different yield component characters.

## MATERIALS AND METHODS

Twenty five genotypes of blackgram were grown in a randomised block design with four replications during *rice fallow* season 1996 at Tamil Nadu Rice Research Institute,Aduthurai. The row and plant spacings were maintained as 30 cm and 10 cm respectively. Cultural practices recommended for rice fallow crop were followed. Observations were recorded on five randomly selected plants from each replication for plant

height (cm), primary branch number, cluster number, pod number, pod length ,seed number per pod, 100 seed weight and seed yield. Genotypic, phenotypic and environmental correlations were computed as per the method suggested by Johnson *et al.*, (1955). The path analysis was done as per the procedure outlined by Dewey and Lu (1959).

## RESULTS AND DISCUSSION

Phenotypic and genotypic correlation coefficients between yield and its components and also their inter-correlations are presented in Table 1.

In general, the genotypic correlations were slightly higher than the phenotypic correlations. In spite of strong inherent phenotypic association between various characters, the environment may modify the full expression of the genotypes (Nandupuri *et al.*, 1973).

Seed yield had high significant positive association with plant height and pod number. The interralationships indicated that these characters were important in selection programme for improving the seed yield. Soundarapandian *et al.*,(1976) and Muthiah and Sivasubramanian (1981) have reported similar results.

The plant height had high significant positive association with primary branch number, cluster number and seed number per pod both at genotypic and phenotypic levels and thair positive correlation with seed yield indicated that these characters can be apparently used as selection criteria for improving seed yield in blackgram. Soundarapandian *et al.*,(1976) and Muthiah and Sivasubramaniam (1981) reported similar results. Primary branch number had significant positive association with cluster number. Thisis in accordance with the findings of Shanmugasundaram (1989). Cluster number,pod number and pod length showed significant positive correlation with 100 seed weight. This is similar to the findings of Rao *et al.*,(1983) and Nainar Mohamed (1991).

The direct and indirect effects and total correlation of individual character on seed yield are presented in Table 2. Path analysis revealed that plant height had high positive genotypic and phenotypic direct effects on seed yield in addition to its high significant association (Table 2). It also

**Table 1. Phenotypic and genotypic correlations among yield and other component characters**

| Characters | Primary branch number | Cluster number | Pod number | Pod length | Seed number per pod | 100 seed weight | Seed yield |
|---|---|---|---|---|---|---|---|
| Plant height | 0.507** | 0.530** | 0.365 | 0.073 | 0.468* | 0.381 | 0.628** |
| | 0.523** | 0.551** | 0.385 | 0.073 | 0.498* | 0.394 | 0.634** |
| Primary branch number | | 0.514** | 0.316 | 0.048 | 0.212 | -0.018 | 0.271 |
| | | 0.555** | 0.351 | 0.048 | 0.241 | -0.017 | 0.280 |
| Cluster number | | | 0.349 | 0.156 | 0.151 | 0.445* | 0.313 |
| | | | 0.373 | 0.160 | 0.192 | 0.469* | 0.324 |
| Pod number | | | | 0.246 | -0.025 | 0.435* | 0.574** |
| | | | | 0.248 | -0.020 | 0.465* | 0.599** |
| Pod length | | | | | -0.256 | 0.405* | 0.058 |
| | | | | | -0.271 | 0.420* | 0.057 |
| Seed number per pod | | | | | | -0.044 | 0.315 |
| | | | | | | -0.053 | 0.340 |
| 100 seed weight | | | | | | | 0.362 |
| | | | | | | | 0.370 |

* Significant at 5% level

** Significant at 1% level

Table 2. Direct and indirect phenotypic and genotypic effects on seed yield through other characters in blackgram

| Characters | Plant height | Primary branch number | Cluster number | Pod number | Pod length | Seed number per pod | 100 seed weight | Seed yield |
|---|---|---|---|---|---|---|---|---|
| Plant height | **0.491** | -0.051 | -0.043 | 0.166 | -0.004 | 0.055 | 0.015 | 0.628** |
| | **0.485** | -0.072 | -0.042 | 0.193 | -0.003 | 0.072 | 0.003 | 0.634** |
| Primary branch number | 0.249 | **-0.102** | -0.041 | 0.144 | -0.003 | 0.025 | 0.001 | 0.271 |
| | 0.253 | **-0.139** | -0.042 | 0.176 | -0.002 | 0.035 | 0.001 | 0.280 |
| Cluster number | 0.260 | -0.052 | **-0.080** | 0.159 | -0.009 | 0.018 | 0.018 | 0.313 |
| | 0.267 | -0.077 | **-0.076** | 0.187 | -0.008 | 0.028 | 0.003 | 0.324 |
| Pod number | 0.179 | -0.032 | -0.028 | **0.455** | -0.014 | -0.003 | 0.003 | 0.574** |
| | 0.187 | -0.049 | -0.028 | **0.501** | -0.012 | -0.003 | 0.017 | 0.599** |
| Pod length | 0.035 | -0.005 | -0.013 | 0.112 | **-0.059** | -0.030 | 0.016 | 0.058 |
| | 0.036 | -0.007 | -0.012 | 0.124 | **-0.047** | -0.030 | 0.003 | 0.057 |
| Seed number per pod | 0.230 | -0.022 | -0.012 | -0.012 | 0.015 | **0.117** | -0.002 | 0.315 |
| | 0.241 | -0.033 | -0.015 | -0.010 | 0.013 | **0.144** | 0.001 | 0.340 |
| 100 seed weight | 0.182 | 0.002 | -0.036 | 0.198 | -0.024 | -0.005 | **0.039** | 0.362 |
| | 0.191 | 0.002 | -0.036 | 0.233 | -0.020 | -0.008 | **0.007** | 0.370 |

* Significant at 5% levelResidual P = 0.4353

** Significant at 1% levelG = 0.4075

Diagonal figures in bold indicate direct effects

exhibited positive direct effects on seed yield through pod number, seed number per pod and 100 seed weight. As these traits had positive effect on plant height, they should be considered while selecting high yielding genotypes. Similar results were reported by Soundarapandian *et al.*(1976), Das (1978), Patel and Shah (1982) and Rao *et al.*(1983).

Though pod number had high positive direct effect on seed yield, it had high negative indirect effect on yield. In the path analysis reported by Singh *et al.* (1972),it is evident that the pod number has a direct influence on seed yield.

Primary branch number followed by cluster number and pod length contributed only negative direct effect on seed yield. Rao *et al.* (1983) reported similar results. Among the indirect effects, cluster number exerted the highest effect followed by primary branch number and seed number per pod through plant height. Roa *et al.* (1983) obtained similar results. This further supports the importance of plants height in increasing seed yield. The heighest negative indirect effect was exerted by plant haight and cluster number through primary branch number.

It can be concluded that plant height followed by pod number are the major yield components in black gram.

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# CHARACTER ASSOCIATION AND PATH ANALYSIS IN GRAIN SORGHUM (*Sorghum bicolor* (L.) moench)

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**ABSTRACT**

Sixty hybrids of sorghum were evaluated to know the magnitude and direction of association between yield and component traits during rabi and summer seasons of 1994 in four locations. Positive and significant association was noticed between grain yield and component traits except days to 50 per cent flowering and days to maturity. Improvement in grain yield in sorghum would be possible through selection for stem thickness, number of rachis per panicle and 100 grain weight.

KEY WORDS : Sorghum, Correlation, Path-coefficients, Grain yield

Sorghum (*Sorghum bicolor* (L.) moench) is an important food and feed crop cultivated in kharif, rabi and summer seasons in Tamil Nadu. The rainfed vertisol regions of southern parts of Tamil Nadu are highly heterogeneous in land inclination, soil profiles, water and nutrient status. In such highly mosaic environments, sorghum crop is cultivated. Grain yield is a polygenic character and it is influenced by a number of component traits which are inturn inter-related. selection of plants combining all superior characters will be very difficult. A knowledge of the magnitude and direction and direction of association between yield and its components will be much useful to improve the yield through a selection of component traits. Such studies are limited to kharif season (Singh and Baghel,1977). The present study was, therefore, taken up to know the nature of character association among yield components and to estimate the direct and indirect effects of different yield components in sorghum F1 hybrids grown in rabi and summer seasons.

## MATERIALS AND METHODS

Sixty F1 sorghum hybrids were developed by crossing five cytoplasmic genic male sterile lines with 12 medium tall sorghum genotypes. These hybrids were evaluated during rabi season (September-October) in the black cotton soils of the Regional Research Station, Aruppukottai and Agricultural Research Station, Kovilpatti (April-August). The plants were spaced between 45 x 15 cm and each hybrid was accomodated in two row plots with 20 plants in each row. The experiment was carried out in all the four environments. The observations were recorded on 10 random plants in each plot under each environment for days to 50 percent flowering (days), plant height