

# CORRELATION AND PATH ANALYSIS OF SOME PHYSIOLOGICAL TRAITS IN BLACKGRAM (*VIGNA MUNGO* (L.) Hepper

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## ABSTRACT

Total biomass per plant, nitrogen content at prepodding stage and harvest index showed positive and significant association with seed yield, while nitrogen content at harvest stage showed nonsignificant association and specific leaf weight showed negative correlation with seed yield. Path analysis studies revealed that nitrogen content at prepodding stage, total biomass per plant and harvest index showed positive direct effects. Positive correlation of these traits along with positive direct effects indicated usefulness of these traits for direct selection. Specific leaf weight and nitrogen content at harvest stage gave negative direct effects reflecting meagre importance for yield improvement in blackgram.

**KEY WORDS :** Black gram, Correlation, Path analysis.

Blackgram varieties available at present are characterised by long duration and low yield potential, though they are well adapted. Selection for superior genotypes can be made as considerable genetic variation exists in the population. Future strategies for obtaining higher yield will give emphasis on the biological potential of the crop. For this, various physiological parameters influencing yield should be indentified so that they can be used as selection indices for screening available genotypes. Studies are limited on the direct and indirect effects and the association of physiological traits with yield, while modern trend for increasing yield potential gives emphasis for tapping biological potential of the crops. Subrahmanyam and Pandey (1981) reported positive association between specific leaf weight and yield and also total biomass and yield in blackgram. Significant association between specific leaf weight and harvest index in peas was observed by Hobbs and Mabon (1982). Ball *et al.* (1982) reported positive and significant association between yield and total biomass in groundnut.

## MATERIAL AND METHODS

Fourty five genotypes of blackgram were sown at the Agricultural College Farm, Bapatla during Rabi 1984 in a randomized

block design with three replications, in plots of 4 rows of 3 m length with 30 x 1: cm spacing. The crop was provided with basal dose of 20 kg N, 40 kg P<sub>2</sub> O<sub>5</sub>/ha. Data were recorded on five randomly selected plants in each treatment replicationwise. Phenotypic and genotypic correlation were worked out using the formula suggested by Falconer (1964). Path coefficients were worked out by the method suggested by Dewey and Lu (1959).

## RESULTS AND DISCUSSION

Among the characters studied, nitrogen content of the plant at prepodding stage total biomass per plant and harvest index showed positive and significant association with seed yield per plant (Table 1). High positive and significant association with seed yield indicated that accumulation of more photosynthates in the development of plants will finally lead to increased production. Nitrogen content at prepodding stage also showed positive and significant association with other characters like nitrogen content at harvest stage and total biomass per plant.

Nonsignificant association between yield and nitrogen content at harvest indicated that both the characters are inherited independently. Specific leaf weight showed

**Table 1. Estimates of genotypic and phenotypic correlation coefficients between yield and five physiological traits in blackgram.**

	Nitrogen content at prepodding	Nitrogen content at harvest	Total biomass / plant	Harvest index	Seed yield per plant
Specific leaf weight	-0.2435 (-0.2560)	-0.2256 (0.2363)	-0.0245 (0.0584)	-0.1328 (-0.6370)	-0.1166 (-0.1947)
Nitrogen content at prepodding		0.8390** (0.8980)	0.3476** (0.4397)	0.1579 (0.9088)	0.3046* (0.4497)
Nitrogen content at harvest			0.0453 (0.0899)	0.0433 (0.2177)	0.0565 (0.1066)
Total biomass/plant				0.0778 (0.2191)	0.8291** (0.9905)
Harvest index					0.5680** (0.9035)

\* and \*\* Significant at  $P = 0.05$  and  $0.01$  respectively  
Values in the parenthesis indicate genotypic correlation coefficients.

**Table 2. Estimates of direct and indirect effects of five physiological traits in blackgram.**

	Specific leaf weight	Nitrogen content at prepodding	Nitrogen content at harvest	Total biomass / plant	Harvest index	Observed genotypic correlation with seed yield
Specific leaf weight	-0.0298	-0.0450	-0.0382	-0.4220	-0.1159	-0.1947
Nitrogen content at prepodding	0.0076	<u>0.1758</u>	-0.1448	0.2452	0.1653	0.4496
Nitrogen content at harvest	0.0070	0.1568	<u>-0.1618</u>	0.0649	0.0396	0.1065
Total biomass/plant	0.0017	0.0597	-0.0145	<u>0.7218</u>	0.2218	0.9905
Harvest index	0.0190	0.1590	-0.0352	0.5800	0.1119	0.9036

Residual error : 0.003

Underlined values indicate direct effects

non significant and negative association with all the characters including seed yield per plant.

Path analysis studies revealed that nitrogen content at prepodding stage, total biomass per plant and harvest index showed positive direct effects. Positive direct effect as well as correlation coefficients indicated that selection may be exercised for these traits for yield improvement.

The direct effects of specific leaf weight and nitrogen content at harvest were negative indicating that the contribution of these characters was meagre for yield improvement. Total biomass per plant showed high direct effect amongst the characters.

From the above results, it could be concluded that total biomass per plant and

nitrogen content at prepodding stage showed positive, significant association with seed yield and high positive direct effects. Hence, the direct selection based on these traits could be more effective in blackgram.

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