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CHARACTER ASSOCIATION AND PATH ANALYSIS IN SORGHUM (Sorghum bicolor)

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ABSTRACT

Sixty sorghum hybrids along with sixteen parents were studied in summer for genotypic correlation and path analyses. Grain yield exhibited a strong positive association with seedling vigour and 100 grain weight but a weak positive association with panicle length at genotypic level. The path analysis revealed that maximum direct effect on grain yield was exerted by panicle length followed by seedling vigour, 100 grain weight, number of leaves per plant and L/B ratio.

KEY WORDS : Sorghum, Correlation, Path analysis

The expression of complex characters such as grain yield depends upon the interplay of a number of component attributes. Knowledge of correlation between yield and other plant characters is helpful in selection of suitable plant type. When more characters are included in correlation study, the indirect association become complex. In such situations, the path co-efficient analysis is helpful. Selection on the basis of direct and indirect effects is much more useful than selection for yield *per se*. Hence, study was undertaken with diverse cytoplasmic hybrids to study the correlation and path co-efficients among yield and its components.

MATERIALS AND METHODS

Sixty hybrids were obtained from crossing ten diverse cytosteriles with six testers in line x tester mating design. The sixty hybrids along with sixteen parents were grown in a randomised block design with three replications in summer 1991. Observations were recorded on five random competitive plants in each of the parents the F_1's in each replication. Correlation co-efficient (Johnson et al., 1955) and path co-efficient analysis (Dewey and Lu, 1959) were carried out.

Table 1. Genotypic correlation co-effecients between different pairs of characters

	Yield	Seedling vigour	Days to 50 per cent flowering	Plant height	Panicle length	Number of leaves per plant	L/B ratio	100 grain weight
Yield	1	0.4939**	0.0807	0.2085	0.2739*	0.2127	0.0335	0.4242**
Seedling vigour		1	-0.2063	0.1501	-0.2169	-0.1284	0.1167	0.5851**
Days to 50 per cent flowering			1	0.0626	0.3529**	0.8499**	-0.1040	-0.1079
Plant height				1	0.4373**	0.2245	0.2889*	0.3129**
Panicle length					1	0.5332**	-0.0992	-0.2172
Number of leaves per plant						1	-0.1686	-0.0497
L/B ratio							1	0.0387
100 grain weight								1

* P = 0.05   **P = 0.01

Table 2. Path analysis.

	Seedling vigour	Days to 50 per cent flowering	Plant height	Panicle length	Number of leaves per plant	L/B ratio	100 grain weight	Genotypic correlation co-efficien
Seedling vigour	0.4212	0.0155	-0.0382	-0.1110	-0.0195	0.0131	0.2128	0.4939**
Days to 50 per cent flowering	-0.0869	-0.0753	-0.0159	0.1808	0.1290	-0.0117	-0.0392	0.0807
Plant height	0.0632	-0.0047	-0.2543	0.2240	0.0341	0.0324	0.1138	0.2085
Panicle length	-0.0914	-0.0266	-0.1111	0.5122	0.0809	-0.0111	0.0790	0.2739*
Number of leaves per plant	-0.0541	-0.0640	-0.0570	0.2731	0.1518	-0.0189	-0.0181	0.2127
L/B ratio	0.0492	0.0078	-0.0735	-0.0508	-0.0256	0.1123	0.0141	0.0335
100 grain weight	0.2465	0.0081	-0.0796	-0.1112	-0.0075	0.0043	0.3636	0.4242**

* P = 0.05   **P = 0.01
Residual value = 0.72

RESULTS AND DISCUSSION
Correlation studies

Grain yield exhibited a strong positive association with seedling vigour and 100 grain weight. But a weak positive association with panicle length at genotypic level was observed (Table 1). This showed grain yield is mostly deter mined by the early vigour of the seedling and 100 grain weight, to some extent of panicle length also. Patel *et al.* (1990) have also observed positive corre lation between grain yield and 100 grain weight.

Days to 50 per cent flowering showed positive and highly significant correlation with number of leaves and panicles length. Patel *et al.* (1980) also observed similar results. The correlation between plant height and panicle length and with 100 grain weight was positive and highly significant. These results are in conformity with the earlier work of Panchal *et al.* (1978). (plant height and panicle length are positively correlated) and Shinde (1981) (positive association between plant height and 100 grain weight). The panicle length significantly correlated with number of leaves per plant.

Path analysis

Path values based on genotypic correlation showing direct and indirect effects of seven characters on yield are presented in the Table 2. The path analysis in the present study revealed that maximum direct effect on grain yield was exerted by panicle length. This result is in accordance with the finding of Patil *et al.* (1990).

The positive direct effect of panicle length on grain yield was decreased by negative indirect effect of plant height, seedling vigour, days to 50 per cent following and L/B ratio.

Seedling vigour, 100 grain weight, number of leaves per plant, L/B ratio also exerted direct positive effects on grain yield followed by panicle length.

For developing high yielding sorghu genotypes in the present study, larger panic length is essential at the same time, days to 50 pe cent flowering and plant height has to be adjustec properly because they exhibited negative direc effect on grain yield. Similarly while concentratin; particular character for improvement, the carefu elimination of negative indirect effects contributin; to the character is necessary and need to be programmed accordingly while exercising selection in the segregating populations.

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