



Character Association for Yield and Yield Attributes in Sorghum (*Sorghum bicolor* L. Moench.)

D Pedda Swamy, B Narendra, V Jayalakshmi, D Bharathi and P Umamaheswari
Department of Genetics and Plant Breeding, Agricultural College, Mahanandi

ABSTRACT

The present investigation was carried out with 81 sorghum genotypes to assess the association of yield components on grain yield per plant. Results of correlation analysis indicated that the grain yield per plant was found to be significant and positively correlated with panicle weight, 1000-seed weight, harvest index and number of primaries per panicle. Panicle length showed significant negative association with grain yield per plant. Thus the present study indicated that panicle weight, 1000-seed weight, harvest index and number of primaries per panicle are important characters in deciding grain yield per plant. Hence these characters may be considered as selection indices in sorghum breeding programme.

Key words : Attributes, Character association, Yield.

Sorghum is one of the most important staple diets popular among the farmers in arid and semi arid tropics of world. It is fourth most important food crops of India, next to rice, wheat and maize. Sorghum area is fast declined for the past 10 decades yet it will continue to be an important food grain in India since its relative importance for alternative uses such as poultry and cattle feed, livestock forage, starch, sugar and alcohol. Yield is a complex character, which depends upon many independent yield contributing characters. Knowledge on the magnitude and type of association between yield and its components greatly helps in evaluating the contribution of different components towards yield. Therefore information on nature of association between yield and its components is of paramount importance in increasing the productivity and sustainability of sorghum production. In the present study, such analysis has been carried out with 81 sorghum genotypes.

MATERIAL AND METHODS

Eighty one germplasm lines of sorghum were evaluated in simple lattice design with two replications at Agricultural College, Mahanandi during *maghi* season, 2012. Each entry was sown in single row with 3m long with 45 cm row to row spacing and 15 cm plant to plant spacing. Recommended cultural practices were adopted to raise a crop. In each accession, five plants were selected randomly and used for collecting data on

days to 50 percent flowering, days to maturity, plant height (cm), panicle weight (g), panicle length (cm), number of primaries per panicle, 1000-seed weight (g), stover yield per plant (g), harvest index and grain yield per plant (g). The genotypic and phenotypic correlation coefficients were worked out as suggested by Johnson *et al.* (1955).

RESULTS AND DISCUSSION

Knowledge of the relationship among yield components is essential for the formulation of breeding programme aimed at achieving the desired combinations of various components of yield. The estimates of correlation coefficients among different characters indicate the extent and direction of association. The correlation coefficients provide a reliable measure of association among the characters and help to differentiate vital associations useful in breeding from those of the non vital ones (Falconer, 1981).

In the present investigation, correlation is worked out among ten characters. Genotypic and phenotypic correlations between yield and its components were in perfect agreement with each other. However, genotypic correlation exhibited slightly higher magnitude than phenotypic correlation for all characters (Table 1).

Grain yield per plant was found to be significant and positively correlated with panicle weight, 1000-seed weight, harvest index and number of primaries per panicle. A strong correlation of these traits with grain yield indicated

Table 1. Phenotypic and genotypic correlation coefficients between yield and yield components in sorghum genotypes.

Characters	DFF	DTM	P H(cm)	P W (g)	P L (cm)	N P P	1000 S W (g)	S Y P P (g)	H I	G Y P P (g)
DFF	1.000	0.936***	0.517***	0.236**	-0.374***	0.552***	0.228**	0.790***	-0.505***	0.269***
	r_p									
		0.951***	0.537***	0.240**	-0.425***	0.733***	0.244**	0.847***	-0.537***	0.276***
	r_g									
DTM	1.000	1.000	0.537***	0.310***	-0.310***	0.528***	0.274***	0.808***	-0.450***	0.343***
	r_p									
		0.573***	0.573***	0.327***	-0.352***	0.758***	0.290***	0.866***	-0.477***	0.359***
	r_g									
P H (cm)		1.000	1.000	0.204**	0.018	0.314***	0.213**	0.550***	-0.386***	0.209*
	r_p									
				0.207**	-0.001	0.412***	0.257**	0.586***	-0.414	0.208*
	r_g									
P W (g)			1.000	1.000	-0.370***	0.379***	0.830***	0.327***	0.496***	0.992***
	r_p									
					-0.420***	0.426***	0.904***	0.350***	0.520***	1.00***
	r_g									
P L (cm)					1.000	-0.428***	-0.221**	-0.343***	-0.047	-0.374***
	r_p									
						-0.657**	-0.260**	-0.450***	-0.026	-0.417***
	r_g									
N P P						1.000	0.368***	0.575***	-0.197*	0.397***
	r_p									
							0.514***	0.825***	-0.303***	0.487***
	r_g									
1000 S W (g)							1.000	0.356***	0.325***	0.835***
	r_p									
								0.411***	0.372***	0.91***
	r_g									
S Y P P (g)								1.000	-0.571***	0.356***
	r_p									
									-0.554***	0.378***
	r_g									
H I									1.000	0.477***
	r_p									
										0.500***
	r_g									

* Significant at 1% level ** Significant at 0.5% level, *** Significant at 0.1% level DFF= Days to 50 percent Flowering, DTM = Days to Maturity, PH = Plant Height (cm), PW = Panicle Weight, PL = Panicle Length (cm), NPB=Number of Primaries per Panicle, 1000 SW = 1000 Seed Weight(g), SYPP = Stover Yield per Plant (g), HI = Harvest Index (%) and GYPP = Grain Yield per Plant (g)

that simultaneous improvement of all the characters is possible. Prasuna *et al.* (2012), Vijaya kumar *et al.* (2012), Aruna and Audilakshmi (2008), Deepalakshmi and Ganesamurthy (2007) and Ezeaku and Mohammad (2006) reported that there is significant and positive association between panicle weight and grain yield per plant. Similarly, Prasuna *et al.* (2012), Vijaya kumar *et al.* (2012), Mahajan *et al.* (2011), Warked *et al.* (2010), Aruna and Audilakshmi (2008), Elagovan *et al.* (2007), Hemalata Sharma *et al.* (2006) and Ezeaku and Mohammad (2006) were reported that 100-seed weight is significantly positively associated with grain yield per plant. Vijaya kumar *et al.* (2012), Mahajan *et al.* (2011) and Tariq *et al.* (2007) reported that harvest index is significant and positive association with grain yield per plant. Panicle length showed significant negative correlation with grain yield per plant.

Regarding inter correlations between different characters revealed that days to 50 percent flowering, days to maturity and plant height showed significant positive association except harvest index and panicle length reported significant negative association with grain yield per plant. Panicle weight had significant positive correlation with 1000-seed weight, harvest index, number of primaries per panicle and stover yield per plant but negative significant correlation with panicle length. Panicle length exhibited significant negative association for all characters except harvest index and plant height, showed negative non significant correlation. Number of primaries per panicle showed positive significant association with stover yield per plant and 1000-seed weight but negative significant correlation with harvest index. 1000-seed weight exhibited positive significant correlation with stover yield per plant and harvest index.

From the correlation studies, it was inferred that grain yield per plant had significant and positive association with panicle weight, 1000-seed weight, harvest index and number of primaries per panicle. Hence, in the improvement programme due importance may be given for these traits to improve genetic yield potential in sorghum genotypes.

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