

Short Communication

Component Analysis for Stover Yield in Sorghum

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Sorghum (*Sorghum bicolor* L. Moench) is a widely grown fodder crop that can withstand moisture stress. While variability in its population, especially for the characters where improvement is sought for, is important for successful crop improvement programme, character association and path coefficient analysis help in indirect selection for the trait. An attempt has been made here to evaluate sorghum germplasm from different ecogeographic regions for identification of genetic variability in some agromorphological traits.

The study was initiated in 1992 on 170 sorghum accessions (158 exotic and 12 indigenous) and 5 checks (CSH 9, CSV 10, CSV 13, SPV 96 and SPH 468). All the germplasm lines were grown in an augmented randomized complete block design with 10 blocks at the experimental field of Rajasthan College of Agriculture, Udaipur. Each entry was grown in separate rows of 4 m length that were spaced 45 cm apart, with plant to plant distance of 10 cm. Observations were recorded on five randomly selected plants for nine different traits. The data were used to compute variances and covariances as suggested by

Federer (1956). Path coefficient analysis was carried out according to Dewey and Lu (1959).

Analysis of variance revealed significant variability in all the nine characters studied. The higher percentages of both phenotypic coefficient of variation (PCV; 61.18) and genotypic coefficient of variation (GCV; 60.39) were observed for stover yield plant<sup>-1</sup>, followed by harvest index, flag leaf area plant<sup>-1</sup> and leaf area plant<sup>-1</sup>. The lowest values of PCV (5.17) and GCV (4.99) were recorded for days to maturity (Table 1). The heritability (H) was highest for days to 50% flowering (98.14), followed by stover yield, plant height, days to maturity and number of leaves plant<sup>-1</sup>. The estimate of genetic advance as per cent of mean (GA%) ranged from 9.91 (days to maturity) to 122.79 (stover yield plant<sup>-1</sup>). Plant height, stover yield, leaf area, flag leaf area, peduncle length and harvest index showed high GCV, high H and high GA%. Therefore, selection based on these traits would be more effective for crop improvement. According to Johnson *et al.* (1955), heritability and genetic advance, as per cent of mean, should be considered for formulation of an efficient breeding programme.

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Table 1. GCV, PCV, H and GA% for different characters of sorghum plant

Character	GCV	PCV	H	GA%
Days to 50% flowering	12.53	12.65	98.14	25.57
Days to maturity	4.99	5.17	92.95	9.91
Plant height (cm)	25.17	25.72	95.77	50.74
No. of leaves plant <sup>-1</sup>	16.49	17.32	90.71	32.36
Leaf area plant <sup>-1</sup> (cm)	31.29	33.17	88.97	60.79
Flag leaf area plant <sup>-1</sup> (cm)	33.27	36.05	85.14	63.23
Peduncle length (cm)	27.36	29.66	85.12	52.00
Harvest index	39.28	42.67	84.76	74.50
Stover yield plant <sup>-1</sup> (g)	60.39	61.48	97.42	122.79

Stover yield per plant showed positive and significant correlation with days to 50% flowering, days to maturity, plant height, number of leaves per plant, leaf area plant<sup>-1</sup> and flag leaf area plant<sup>-1</sup>. Patel *et al.* (1973) also reported significant positive correlation of fodder yield with plant height and leaf area plant<sup>-1</sup>. Correlations between days to 50% flowering, days to maturity, number of leaves plant<sup>-1</sup>, leaf area plant<sup>-1</sup>, and flag leaf area plant<sup>-1</sup> were positive and significant. This suggests that simultaneous

selection for these traits will help in improving the stover yield. Badwal (1971) observed significant positive correlation between leaf number and days to maturity.

Path coefficient analysis showed that out of 6 traits that had significant and positive correlation with stover yield, only 2 traits (plant height and leaf area plant<sup>-1</sup>) had positive and high direct effect (Table 2). The positive correlation of other traits with stover yield were mainly due to their indirect effect via leaf area plant<sup>-1</sup>.

Table 2. Path coefficient analysis indicating direct and indirect effects of various components on fodder yield in sorghum (*Sorghum bicolor* (L.) Moench)

Character	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	Corr. with stover yield/plant
Days to 50% flowering (A)	-0.2046	0.1368	0.0494	0.0009	0.2613	-0.0550	0.0853	0.1873	0.4615*
Days to maturity (B)	-0.1687	0.1660	0.0393	0.0008	0.2243	-0.0421	0.0708	0.1604	0.4509**
Plant height (C)	-0.0347	0.0224	0.2914	0.0003	0.1165	-0.0344	0.0156	0.1322	0.5093**
Leaf no. plant <sup>-1</sup> (D)	-0.1885	0.1266	0.0836	0.0010	0.2891	-0.0728	0.0889	0.2102	0.5380**
Leaf area plant <sup>-1</sup> (E)	-0.1618	0.1126	0.1027	0.0009	0.3300	-0.0821	0.0801	0.1765	0.5594**
Flagleaf area plant <sup>-1</sup> (F)	-0.1129	0.0701	0.1006	0.0007	0.2723	-0.0996	0.0711	0.1351	0.4373*
Peduncle length (G)	0.1356	-0.0913	-0.0354	-0.0007	-0.2055	0.0550	-0.1288	-0.1461	-0.4172*
Harvest index (H)	0.1105	-0.0767	-0.1110	-0.0006	-0.1681	0.0388	-0.0542	-0.3470	-0.6084**

Residual effect = 0.6815; \* Significant at 5%; \*\* Significant at 1%.

**References**

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