

## Short Communication

### Variability and Association in Drought Tolerant Genotypes of Sorghum (*Sorghum bicolor* (L.) Moench)

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Sorghum (*Sorghum bicolor* (L.)) is an important crop of dryland agriculture. In India it covers 13% of gross cropped area in semi-arid parts of the country. The productivity of sorghum in semi-arid areas is very low because of low and erratic rainfall. Such an environment has a masking effect on the variability. ICRISAT has developed a nursery of drought tolerant entries including variable cultivars from all over the world.

This paper deals with the genetic variability and nature of association in the material.

Eighty one tolerant genotypes were sown in Random Block Design (RBD) with two replications at the experimental field of Rajasthan College of Agriculture, Udaipur. Each plot comprised of five metre long two rows placed 45 cm apart with a distance of 15 cm between plants.

Observations were recorded from randomly selected 10 plants. Observation on days to flower and days to maturity were recorded on population basis. Plot means were subjected to analysis of variance. Variability parameters, viz., GCV, PCV, heritability and expected genetic gain and association parameters, viz., correlation coefficients and path coefficients were computed for statistical analysis (Panse and Sukhatme, 1978).

The experimental material possessed considerable variability for all the fifteen char-

acters studied. High magnitude of GCV was observed for ear head exertion index, grain yield per plant, plant height, panicle length, flag leaf area, number of primaries per panicle and number of leaves per plant, indicating a good deal of genetic variability (Table 1). Goud and Asawa (1978) also reported high GCV for plant height and number of primaries per panicle. Out of these characters the high heritability was recorded for stover yield per plant, days to flowering, plant height, panicle length, grain yield per plant, number of leaves per plant, harvest index, days to maturity and number of whorls of primaries per panicle. Liang *et al.* (1969) reported high heritability for days to flowering, leaf number per plant and plant height. High selection response is expected for grain yield/plant harvest index, stover yield per plant, plant height and panicle length as these characters had higher estimates of expected genetic gain with high variability and heritability. Similar results were reported by Giriraj and Goud (1983): Direct selection for yield is not much effective because of its polygenic nature. Therefore, simultaneous selection for component characters is advocated. To identify component characters, correlation coefficients and path coefficients were worked out. Genotypic correlation of grain yield per plant was positive and significant with harvest index, 500 grain weight, flag leaf area and leaf area per plant. Panicle length

Table 1. Estimates of genotype coefficient of variance (GCV), heritability and genetic gain for different characters in sorghum

Characters	Genotypic coefficient of variation	Heritability	Genetic gain (2)	Grain yield	
				Genotypic correlation coefficients	Phenotypic correlation coefficients
Days to flowering	16.42	96.31	33.20	-0.2023	-0.2005
Days to maturity	7.20	87.91	13.90	0.0038	0.0037
Plant height	27.33	95.68	55.07	0.0090	-0.0015
Number of leaves/plant	22.16	89.97	43.34	0.0166	-0.0034
Leaf area/plant	19.88	70.40	34.54	0.3255**	0.0099**
Flag leaf area/plant	24.95	72.95	43.89	0.3394**	0.3183**
Length of sheathing leaf base of flag leaf	9.36	61.88	15.14	0.1444	0.1134
Ear head exertion index	36.53	61.65	59.13	-0.1437	-0.1150
Panicle length	26.02	93.97	51.98	0.1878	0.1848
Number of whorls of primaries/panicle	18.23	77.35	33.05	0.12264	0.1055
Number of primaries/panicle	23.52	96.23	47.52	0.1620	0.1516
Stover yield/plant	27.48	96.57	55.62	0.1714	0.1613
Harvest index	31.46	89.01	61.16	0.7510**	0.7571**
500 grain weight	17.06	71.37	29.77	0.4619**	0.3927**
Grain yield/plant	36.51	91.66	71.98	-	-

did not show any association with grain yield but had significant positive correlation with harvest index and flag leaf area. Shahne and Borikar (1982) also reported significant positive correlation of these characters. All the above traits had positive direct effect also. These results are in confirmation with the findings of Dabholkar *et al.* (1970), Patil and Thambore (1983) and Kukadia *et al.* (1983). Significant positive correlation of flag leaf area with grain yield was mainly due to its indirect effect through above traits. Thus, a simultaneous selection for harvest index and above traits, including flag leaf area, would be more effective for improvement in grain yield.

## References

- Dabholkar, A.R., Telang, S.W. and Patel, K.C. 1970. Correlation in sorghum hybrid. *Science and Culture* 36: 476.
- Giriraj, K. and Goud, J.V. 1983. Inheritance studies of vegetative characters in grain sorghum. *Genetica Iberica* 35(1-2): 87-95.
- Goud, J.V. and Asawa, B.M. 1978. Yield components in sorghum. *Mysore Journal of Agriculture Science* 12(2): 265-268.
- Kukadia, M.V., Desai, K.B., Desai, M.S., Raja, K.R.V. and Patel, R.H. 1983. Path analysis in genetic collection of sorghum. *Sorghum News Letter* 26: 83-84.
- Liang, G.H.L., Walter, T.L., Nickell, C.D. and Koh, Y.D. 1969. Heritability estimates and inter-relationships among agronomic traits in grain sorghum. *Canadian Journal of Genetic Cytol.* 11: 199-208.
- Panse, V.G. and Sukhatme, P.V. 1978. *Statistical Methods for Agricultural Workers*, ICAR Publication.
- Patil, R.C. and Thambore, M.V. 1983. Genetic parameters, correlation coefficient and path analysis in F<sub>1</sub> and F<sub>2</sub> generation of a 9 x 9 diallel cross of sorghum. *Journal of Maharashtra Agricultural University* 8(2): 162-165.
- Shahane, T.G. and Borikar, S.T. 1982. Character association and path analysis in winter sorghum. *Indian Journal of Agriculture Science* 52(7): 429-431.