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Genotype X Environment Interaction for Grain Yield in Sorghum

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ABSTRACT

Pooled analysis of variance indicated the existance of high genotype - environment interaction for grain yield. The regression analysis indicated that the genotypes showed wide range of adaptability among themselves. The entries M-205 and GJ-36 were proved good responsive. While Surat-1 showed low mean value and low responsive. Further M-51 & GJ-35 showed more or less stable performance under both poor and better environments.

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INTRODUCTION

Stable performance of varieties under different evnironments in respect of economic character like grain yield is of major significance in any breeding programme. The larger the genotype-environment interaction, the lesser are the chances of progress under selection. In the present study, an attemp has been made to assess the adaptability of sorghum genotypes.

MATERIALS AND METHODS

The experimental material, consisting of 8 elite genotype of Sorghum (M-51, M-155, M-205, M-206, M-211, M-229, M-234, M-236) with 4 released varieties namely GJ-35, GJ-36, GJ-37 and Surat-1 evaluated in the monsoon season of 1986-87 at different locations namely Surat, Navasari, Tanchha, Deesa and Waghai. The matarials was planted in randomised block design with three replications. All the entries were grown in 6 row plots keeping 45 x15cm between and within rows spacing respectively. All the required agronomic as well as plant protection measures were taken up uniformaly at all the locations. The plotwise grain yield was recorded at each of the locations. These grain yield data were analysed following Eberhart and Russell, (1966) for estimating stability parameters. Coefficients of determination and ecovalence (W) (Wricke, 1962), were used.

RESULTS AND DISCUSSION

Error mean squares for individual environment were pooled after Bartlett's test of homogeneity. The data revealed that the differences among verieties were significant. Stability analysis was carried out since variety x lacation component was highly significant indicating differential response of the varieties over locations.

In the present study, environmental indices ranged from - 1.167 to 1.001 q/ha. among which Surat (L_1) and Waghai (L_8) were the favourable locations for high grain yield. The significance of locaitons further revealed the facts that there existed a lot of variability among the locations sampled. Highely significant V x L linear interaction indicated that the differences among the regression

TABLE1

Stability parameters for grain yield of sorghum varieties based on five locations.

Entries	Grain yield (Q/ha)				
	$\overline{X}$	b_1	S^2di	r^2	W
1	2	3	4	5	6
M—51	27.94	0.804*	0.1322	0.82	0.63
M—155	24.63	1.764*	0.3944	0.89	3.32
M—205	28.20	1.812*	0.3723	0.95	3.53
M—206	31.23	0.632*	0.8878	0.58	3.23
M—211	23.47	0.552*	0.0091	0.95	0.36
M—229	22.01	0.790*	0.5354	0.75	1.86
M—234	20.67	1.209**	0.0595	0.97	0.43
M—236	24.07	0.853	0.8930	0.69	2.85
GJ—35	29.17	0.676	0.1591	0.86	0.94
GJ—36	24.36	1.642*	0.4146	0.94	2.79
GJ—37	25.86	0.524	0.3844	0.66	2.05
Surat-1	19.05	0.747*	0.0817	0.92	0.57
Mean	25.7				

coefficients pertaining to various genotype on the environmental means were real. Considering the mean, regression coefficient and standard deviation parameters, M-51 and GJ-35 were showed high mean values, low regression coeffiecient with least deviation indicating that thase genotypes can perform well under even poor environments (Table-1). The coefficient of determination ranged from 58 to 97% for grain yield. Excepting for M-206 and GJ-37, most efficient of determination were above 70%. Further, M-205 and GJ-36 were proved good yielders under favourable environments. Data also suggested that the entry Surat-1 was found poor yielder under both better and poor environment as it has registered low mean yield. Thus M-51 and GJ-35 proved good adaptable even under poor environments whereas M-155 and GJ-36 were found responsive. These finding demonstrated that the production response index (regression coefficient) and other stability statistics could be used in addition to mean yield by sorghum breeders in the improvement programme for the crop.

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