The inter correlation studies revealed that the grain yield was significantly correlated with number of closed stomata both under stress and non stress condition. It also recorded significant negative correlation under stress and non significant negative correlation with root length. This indicated that the grain yield is not affected due to drought during early stage of crop growth. Highest non significant correlation was recorded in leaf wilting/rolling score, DMP/plant, and stomatal count under stress condition for grain yield. The straw yield showed significant positive correlation with number of closed stomata, root volume, and leaf wilting score under stress and with DMP/plant under non stress. Number of closed stomata showed significant correlation with green leaf area and leaf water potential under stress and leaf water potential and leaf wilting/rolling score under control. Stomatal count was significantly, positively correlated with number of closed stomata under both condition whereas it is significantly, positively correlated for leaf wilting/rolling score under stress. There was no significant positive or negative correlation between root volume and root length, green leaf area, leaf water potential and leaf wilting/rolling score. Green leaf area wa significant, having positive correlation for ro volume under control but absent under stre condition.

From the study, it was concluded that the wate stress imposed in the early vegetative growt period causes narrow yield reduction compared t control. SPV 393, KS 7193, KS 6312 and TW(120 were found to be promising for most of th physiological characters studied. The inte correlation among ten characters showed that grai yield was significantly having a positive correlatio for number of closed stomata both in stress and non-stress condition. Highest non-significan correlation was observed for grain yield and lea wilting/rolling, DMP/plant and stomata coun under stress.

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STABILITY IN YIELD PERFORMANCE OF ERECT LEAF GENOTYPES OF FINGERMILLET

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ABSTRACT

Stability parameters for grain yield were worked out for five erect leaf genotypes of fingermillett (*ragi*) *viz*., IE 252, IE 503, IE 629, IE 798 and TNAU 5 and four normal high yielding varieteies, PR 202, Co.7, Co.13 and Paiyur 1. Significant differences were observed for genotype, environment and genotypes x environment interaction. TNAU 5 and PR 202 recorded above average response for grain yield, low regression coefficient and low mean square deviation from regression indicating their adaptability to unfavourable environments. All other varieties except IE 252 were found to be adaptable for favourable environment. In general, mean square deviation from regression was very low in all the genotypes studied. There was a decline in grain yield of these genotypes when planted at higher plant density levels.

KEY WORDS : Fingermillet, Spacing Levels, Grain Yield, Stability

Finger millet (*ragi*), *Eleusine coracana* (G), a C_4 and short day plant, is an important grain crop in Southern States of India. The wealth of variability in finger millet offers immense scope for rits genetic improvement. Its wide adaptability to rainfed and irrigated situations makes it a potential food crop. The productivity of *ragi* is higher than that of the great millets, sorghum and pearl millet. Plant population is one of the major factors which influences the crop yield. To improve plant production efficiency, optimum plant population has to be maintained which helps in better utilisation of nutrients, moisture and solar light interception.

Table 1. Pooled analysis of variance.

Source	df		SS	MSS	F value tested against pooled EMS	F value tested against pooled deviation MS
Total	(st-1	26	0.3786	0.0146	3.5610**	8.1111**
Genotypes	(t-1)	8	0.2754	0.0344	8.3900**	19.1111**
Env.+(var+Env)	t (s-1)	36	0.3492	0.0097	2.3659*	5.3889**
Environment	(s-1)	2	0.0369	0.0185	4.5122**	10.2778**
GXE	(t-1) (s-1)	16	0.0663	0.0041	-	2.2778*
Env. (linear)		1	0.0343	0.0343	8.3659*	19.0556**
GXE (linear)	(t-1)	8	0.2753	0.0344	8.3900**	19.1111**
Pooled Deviation	t (s-2)	9	0.0327	0.0036	0.8780	2.0000
Pooled error	(r-1) (t-1) (s-1)	48	0.0861	0.0018	0.4390	-

** Significant at 1% level, * Significant at 5% level t = No. of genotypes s = No. of spacing (environments) r = No. of replicationns.

Genotypes with upright leaves are more efficient in photo synthesising capabilities. Also, these are poor tillering types, but more productive and amenable for dense planting. A study was conducted to understand the stability of their yield performance under varied plant density levels.

MATERIALS AND METHODS

Five promising erect leaf cultures of *ragi* namely IE 252, IE 503, IE 629, IE 798, and TNAU 5, were compared with four high yielding varieties, PR 202, Co.7, Co.13 and Paiyur 1. They were planted at 22.5 x 10 cm, 22.5 x 7.5 cm and 15 x 10 cm spacings, thus creating (unilocational) three environments. The trial was laid out with 27 treatments and replicated thrice during *kharif,* 1991 under semi dry condition at the Regional Research Station, Paiyur. The data on grain yield were analysed following the methods suggested by Finaly and Wilkinson (1963) and Eberhart and Russel (1966) to study both the linear (b) and nonlinear (Sd^2) parameters of phenotypic stability.

RESULTS AND DISCUSSION

Pooled analysis of variance (Table 1) showed that all the sources of variation were significant at 1 per cent or 5 per cent level when tested under pooled error/pooled deviation mean sum of squares, revealing there by the presence of genetic variability among the genotypes included in the present investigation as well as considerable interaction between spacing levels/environmental conditions. Positive and significant differences were obsesrved for genotypes, environment (linear) and GXE (linear) componenets indicating the strong influence of spacing levels on the grain yield of the genotypes. Sharma and Godawat (199) also observed highlty significant differences for genotypes and genotype x environment (linear) in

Table 2. Mean grain yield, regression coefficient (bi) and mean deviations square from regression (Sd^2).

Genotype	Grain yield (kg/ha) S1	S2	S3	Mean	bi	Sd^2
IE 252	1541	1798	2202	1847	-1.4922	-0.0012
IE 503	2430	1264	1402	1699	1.5072	0.0228
IE 629	1975	2040	1575	1863	1.1335	-0.0015
IE 798	2607	2306	1728	2214	2.0243	-0.0010
TNAU. 5	2805	2805	2568	2726	0.6316	-0.0018
PR. 202	2573	2904	2114	2530	1.5728	0.0017
Co. 7	1170	1126	686	994	1.2626	-0.0017
Co. 13	2089	2331	1432	1951	2.0053	0.0004
Paiyur 1	1457	1610	1373	1480	0.3853	-0.0012
SE				210		
CD				596		

S_1 = (spacing) 22.5 x 10 cm. S_2 = (spacing) 22.5 x 7.5 cm. S_3 = (spacing) 15 x 10 cm.

the study of 30 genotypes of foxtail millet under four environments.

The stability analysis for grain yield was carried out for the mean of the three spacings, 22.5 x 10 cm. 22.5 x 7.5 cm. and 15 x 10 cm. accounting for 4.44, 5.93 and 6.67 lakh plant populations per ha. The three parameters of stability *ie.*, mean *per se* performance, regression coefficients (bi) and mean deviation from regression $(Sd)^2$ were worked out and are presented in Table 2. The bi values ranged from (-) 1.4922 to 2.0243. The bi values were low for TNAU 5 and Paiyur 1 indicating that these genotypes are comparatively more responsive to poor environments and for the rest of the genotypes except IE 252, the bi values were more than linearity showing that they are adapted to favourable environments.

The mean deviations square from regression values were very low for all the genotypes. The mean *per se* performance for grain yield ranged from 994 to 2726 kg/ha followed by PR 202 with 2530 kg/ha. The above average response was also indicated by another two genotyes IE 798 and Co13. Considering all the parameters i.e., high mean grain yield, regression coefficient nearer to unity and low mean deviation square from regression TNAU 5 was the best performer. Similar results were observed by Chowdhari and Rameshwar Singh (1979) and Krishnappa and Sherif (1987) in finger millet. Patel *et al.* (1990) indicated that a variety with high mean performance but low regression coefficient is better adapted to unfavourable environment. The culture TNAU 5, being an erect leaf type, recording a high mean yield with regression coefficient less than unity may be more suitable for poor environment such as rainfed condition where moisture strees is very common.

There is relativelyy little published work on population experiments in *ragi*. Samuthuvam (1961) found that the wider spacing was superior to the narrower spacing in grain yield of *ragi*. In the present study also, majority of the genotypes recorded comparatively lesser grain yield under closer spacing than the other two wider spacings (Table 2). The variety PR 202 recorded the highest grain yield under 22.5 x 7.5 cm spacing while TNAU 5 yielded 2805 kg/ha in both the wider spacings i.e., 22.5 x 10 cm and 22.5 x 7.5. The grain yield of TNAU 5 in closer spacing was superior to PR 202 and IE 252. This is in accordance with Linge Gowda *et al.* (1986) who observed decline in grain yield of *ragi* when the optimum plant population was increased. They identified that spacing of 22.5 x 10 cm. or 22.5 x 7.5 cm. was optimum. Murthy and Hegde (1981) observed that the number of tillers and grain yield in Indaf 5 *ragi* variety was reduced when planted at higher density. Studies conducted at Bangalore, have shown that wider spacing upto 45 cm gave similar yields as 25 cm row spacing (Hegde and Linge Gowda, 1989). The present study clearly indicated that *ragi* genotypes are sensitive to closer spacings (higher plant densities). For irrigated or rainfed cropping, reducing the optimum spacing may be avoided. Even in the case of erect leaf types which are shy tillering, reducing the spacing may cause reduction in grain yield.

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