Seed yield of A (AXB) and F1 (AxR) should be aimed for 2000 kg. per hectare with field area ratio of AxB : AxR : F1 at 1:100:5000 ha. Out of 20 lakh ha of rice area in Tamil Nadu, 50 per cent should be brought under hybrid rice cultivation to get 10 lakh t of increased production within five years by hybrid rice alone.

REFERENCES

RAMIAH,K. (1933). Inheritance of flowering duration in rice. Indian J.Agric.Sci.,3 : 377-410.

SIVASUBRAMANIAN,V. and RANGASWAMY,M. (1980). A technique to identify male sterile lines in rice. Rivista di Agriculture Subtropicaele Tropicale 74 : 279-280.

Madras Agric. J., 82(3): 211-213 March, 1995
https://doi.org/10.29321/MAJ.10.A01169

PHENOTYPIC STABILITY FOR SEED YIELD IN GREEN GRAM (*Vigna radiata*) IN SODIC SOIL

M. KANDASWAMI

College of Agricultural Engineering, Tamil Nadu Agricultural University, Kumulur 621 712

ABSTRACT

A set of five improved advanced, genotypes of green gram were evaluated in summer '92, *rabi* '92 and Summer '93 seasons in saline/sodic soil conditions (soil pH 8.6, 8.7 and 8.5). Pooled analysis of variances indicated significant differences among the genotypes and the environments. Moreover, the genotype environment interaction was highly significant indicating differential performance of the genotype under varied environmental conditions. The genotype SSRC 9 showed higher yield and stability of yield performance. The genotype SSRC 7 and CO.5 had high yield stability, better adapted to rich environments. SSRC 6 showed average yield, high stability and better adapted to poor environments.

KEY WORDS : Stability, GXE interaction, Linear Component, Green Gram.

In Tamil Nadu, more than 3 lakh ha are under saline sodic soil. Green gram is generally grown during *kharif*, *rabi* and summer seasons. In addition to cultivation in submarginal lands and poor crop management, low yield potential of the cultivars is a major factor of low productivity of the crop. Most of the improved varieties in the crop show inconsistent performance under varied environmental conditions due to genotype-environment (G.E.) interation. The yielding ability of crop plant is a quantitative character, showing continuous variation and is highly influenced by environmental factors.

The main aim of this study was to evaluate the advanced stage genotypes and to identify the superior ones with high yields over environments especially under sodic soil condition. Finlay and Wilkinson (1963) have suggested use of linear regression (bi) as a measure of stability of genotypes while Eberhart and Russell (1966) have emphasised the need for considering both linear (bi) and non- linear (S^2d) components of G.E. interaction for judging phenotypic stability of genotypes. Bilbro and Ray (1976) suggested use of (bi) as a measure of adaptation and the coefficient of determination (r^2) as the stability parameter. The present investigation was undertaken to identify high yielding stable genotypes suitable for cultivation in saline/sodic soils.

MATERIALS AND METHODS

The material comprised five improved genotypes of green gram developed at different research centres in Tamil Nadu. These were grown in a randomised block design with four replications at the Soil Salinity Research Centre, Tamil Nadu Agricultural University, Tiruchirappalli. The experiment was repeated during summer seasons of 1992, 1993 (January-April) and *rabi* season of 1992 (October-January). The data on seed yield were taken for study of G.E. interaction. The linear (bi) and non-linear (S^2d) components of G.E interaction were calculated as suggested by Eberhart and Russell (1966), while the coefficient of determination (r^2) of the linear regression coefficients was estimated after Bilbro and Ray (1976).

RESULTS AND DISCUSSION

Pooled analysis of variance revealed the existence of significant genetic differences among

Table 1. Analysis of variance for genotype and environ ment interactions for seed yield in green gram.

Source	df	MS
Genotype	4	68153.0**
Env + (Geno. x Env.)	10	37157.5**
Env. (linear)	1	162657.7**
Genotype x Environment (linear)	4	21595.9
Pooled deviation	10	11753.3++
Pooled error	45	214.8

Env : Environment, Geno : Genotype
**P = 0.01 against pooled deviation
++P = 0.01 against pooled error.

the genotypes in respect of seed yield (Table 1). The environments also were significantly different from one another as the mean square component due to environment was highly significant. This may be due to seasonal variations and other microclimatic and soil factors. The genotype and environment interactions component showed that the genotypes reacted considerably with the environmental conditions. A major portion of the genotype and environment interaction variance was accounted for by the presence of linear component although non-linear component (deviation) was also significant. The highly significant genotype x environment and Env.+GXE interaction indicated differential performance of the genotypes under varied environmental conditions. Similar significant G x E interactions for seed yield in green gram was reported by Mishra (1983, 1990) and Singh *et al.*, (1975) in black gram.

According to Eberhart and Russell (1966), ideally adapted variety would be the one having high mean value, unit regression coefficient (b=1) and deviation from regression as small as possible (S^2d=O). Bilbro and Ray (1976) have pointed out that the value of regression coefficient (bi) indicates the adaptation of the genotype to type of environment, while high coefficient of deter mination (r^2) indicates stability. Hence to judge the stability of a genotype both sd^2 and r^2 were taken into consideration. Mean grain yield and the stability parameters *viz.*, regression coefficient (bi), deviation from regression (s^2d) and coefficient of determination (r^2) for the five geno types studied during three seasons are given in Table 2.

In general, genotypes performed better in the summer 1993 when six irrigations were given at different stages of crop growth than four protective irrigations given during *rabi*. Considering the average yield of the genotypes, SSRC 9 gave the highest yield of 1083 followed by SSRC 7 with 942 kg/ha. SSRC.9 showed bi value of 1.1037 indicating that it is well adapted to all types of environments. SSRC 7 showed bi value of 1.4483 indicating its better adaptation to rich environments. Stability of yield of SSRC 7 was high whereas SSRC.9 was moderate. SSRC 6 recorded low S^2d value and high stability of yield and showed bi value of 0.3031 indicating its better adaptation to poor environment. CO5 showed high stability to yield, bi value 2.0975 indicating it better adaptation to yield, bi value 2.0975 indicating its better adaptation to rich environments.

Table 2. Estimates of stability parameters for seed yield (kg/ha) in green gram.

Genotype	Summer 1992	*Rabi* 1992	Summer 1993	Mean	bi	Sd^2	r^2
SSRC.6	808	799	876	827	0.3034	450.67	85.6
SSRC.7	891	784	1151	942	1.4483	2717.9**	96.1
SSRC.9	1259	848	1141	1083	1.1037	49851.5**	44.3
VB.1	483	774	774	677	0.0474	56327.2**	0.1
CO.5	898	535	1075	836	2.0975	7917.3**	94.7
Mean	868	748	1003	873	1.0000		
SE	73	16	41	27	0.6011		
CD	224	50	127	78			
Env. Inex.	-5	-125	+130	-			

REFERENCES

BILBRO, S.D. and RAY, L.L. (1976). Environment stability and adaptation of several cotton cultivars. **Crop Sci., 16:** 821-824.

EBERHART, S.A. and RUSSELL, W.A. (1966). Stability parameters for comparing varieties. **Crop Sci., 6:** 36-40

FINLAY, K.W. and WILKINSON, G.N. (1963). The analysis of adaptation in plant breeding programme. **Aust. Agric. Res., 14:** 742 - 754

MISHRA, R.C. (1983). Variability, correlation and path coefficient analysis in black gram. **Andhra agric. J., 30:** 239-43.

MISHRA, R.C. (1990) Genotype - environment interaction and stability analysis in black gram. **Madras Agric. J., 77:** 531-533.

SINGH, U.P., SINGH, U. and SINGH, P. (1975). Estimates of variability, heritability and correlation for yield and its components in urd. **Madras Agric J., 63:**141-147.

Madras Agric. J., 82(3): 213-214 March, 1995

RESEARCH NOTES

MULTIPLE REGRESSION STUDY IN LINSEED UNDER DRYLAND ENVIRONMENT AND YIELD ATTRIBUTES

Linseed is one of the important oilseeds crops. The reason for low production in India is mainly due to the low per ha yield. To exploit full yield potential, estimation of genetic variability and asso ciations components are essential (Patil *et al.*, 1991; Datapathi *et al.*, 1987; Chaudhary *et al.*, (1984). The present study, therefore, was under taken with a view to obtain information on extent of correlation and regression analysis in respect of important agronomic characters in linseed.

The experiment was conducted at Kanke under dryland with 19 linseed varieties of different agro climatic region in randomised block design with three replication during winter *(rabi)* season 1989 to 1991. Each variety was sown in 6 rows of 4 m length at inter rows 25 cm and inter plants 10 cm. Observations on five randomly selected plants were recorded for seven quantitative characters. Corre lation and multiple line regression analysis were done as per Snedecor and Cochran (1968) on pooled data.

All characters showed significant differences. Significant positive association was found between seed yield and plant height, number of branches per plant and days to maturity (Table 1). Similar results were observed by Haque *et al.* (1994) for plant height and seed yield. Singh and Mahto (1994) and Verma *et al.* (1994) for number of branches/plant and seed yield/plant, Verma *et al* (1994) for days to maturity and seed yield/plant, and Singh and Mahto (1994) for number of branches per plant and number of capsules/plant. Plant height had significant correlation with number of branches per plant and number of seeds per capsule whereas highly positive interrelationship with number of capsules per plant and days to maturity which were also earlier reported by Haque *et al.*, (1994). A highly significant positive association was observed between number of branches per plant and number of capsules per plant as well as days to maturity. Number of capsules per plant showed a highly significant correlation with days to maturity.

The multiple linear regression equation on all characters had contributed 80,345 per cent variability in seed yield (Table 2), while plant height and number of branches showed 50.383 per cent variability in seed yield. The partial regression coefficients of seed yield attributing characters were positive for all characters, which was also reported by Patil *et al.*(1989). This indicates the importance of plant height and number of branches.

KEY WORDS : Linseed, Dry Environment, Yield, Multiple Regression

JAY LAL MAHTO

Department of Plant Breeding and Genetics
Birsa Agricultural University, Ranchi 834 006

Table 1. Correlation between different pairs of characters in linseed under dryland environments

Characters	Number of branches per plant	Days to 50 per cent flowering	Number of capsules per plant	Number of seeds per capsule	Days to maturity	Seed yield per plant
Plant height	0.504*	-0.118	0.643**	0.524*	0.586**	0.562**
Number of branches per plant		-0.143	0.561**	0.046	0.876**	0.663**
Days to 50 per cent flowering			0.337	0.079	-0.149	-0.065
Number of capsules per plant				0.072	0.667**	-0.807**
Number of seeds per capsule					0.068	0.150
Days to maturity						0.677**

*, ** Significant at 5% and 1% probability levels, respectively.