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STABILITY ON SEED YIELD IN PIGEONPEA

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ABSTRACT

Seventeen pigeonpea genetypes were studied for their stability for seed yield over three years. The linear component of regression is not significant against pooled error indicates that the prediction of performance of late maturing pigeonpea genotypes over environments is difficult. However, two genotypes ICP 7991 and ICP 7346 were found stable and also more responsive to environments with high seed yield. These two genotypes can be recommended for highly favourable environments.

KEY WORDS : Stability, pigoenpea, seed yield

Pigeonpea is an important pulse crop traditionally grown in more diversified soil and agro-climatic conditions. The cultivation of pigeonpea genotypes varied widely over a range of agro climatic zones due to lack of stability in yield (Singh *et al.*, 1983). Thus the present investigation has made to identify a stable genotype and study the responsiveness over different environments.

MATERIALS AND METHODS

The experiments were conducted over three different environments (*kharif* 1992, and 94) with 17 diversified late maturing pigeonpea genotypes at the National Pulses Research Centre, Tamil Nadu Agricultural University, Vamban, Tamil Nadu. The experiments were laid out in a randomized block design, with three replications adopting a spacing of 90 x 45 cm. with 4 x 3 m^2. The seed yield was recorded on the single plant basis and converted into kg/ha. The yield was used for statistical analysis and stability parameters were worked out according to the method suggested by Eberhart and Russel (1966). Each year, a given location was considered as an individual environment.

RESULTS AND DISCUSSION

Significance of genotype and mean square due to genotype x environment (GxE) indicated the differential responses in different environments. The mean square due to regression (linear component) was not significant when tested against pooled error (Table 1). This indicated that the prediction of performance of genotypes over different environments would be difficult in late maturing genotypes because of predominance of non linear component as compared to linear component which is in agreement with finding of Singh *et al.* (1983). An ideal variety is one with high mean performance average responsiveness to environment (b=1) and stability over environment ($S^2d = 0$). According to Eberhart and Russel (1966), if S^2d is not significant, the performance of genotypes may be predicted.

Among the 17 entries tested, the genotypes *viz.*, ICP 7991, ICP 7346 and ICP 12159 were found to be stable, since the S^2d values for the genotypes were not significantly deviating from zero. The performance of other genotypes cannot be predicted (Table 2). While considering the regression co-efficients (bi) of the genotypes, ICP 7867, ICP 12825 and ICP 12904 were considered as average responsive genotypes (bi=1). The genotypes ICP 7991, ICP 7346 and ICP 12749 recorded bi value more than unity and hence grouped into responsive category under favourable environment. The genotype ICP 7878, which recorded (bi<0) negative value of bi, is considered

Table 1. Analysis of variance for phenotypic stability for seed yield in pigeonpea

Source	df	Mean squares
Genotypes (g)	16	488.3 **
Environments	2	65.5 **
G X E	32	199.8 **
E + (G X E)	34	191.9 **
E (linear)	1	131.0 **
G X E (linear)	16	174.6 ** ns+
Pooled deviation	17	211.7 **
Pooled error	96	31.9

** significant at 1 % level of probability against pooled error
ns+ Not significant against pooled deviation.

Table 2. Stability parameters for seed yield in pigeonpea

Variety	Mean (kg/ha)	bi	S2d
ICP 7991	1470	7.3 ** ++	-287.6
ICP 12746	1134	-10.2	63780.8 $
ICP 7346	1277	9.2 ** ++	648.2
ICP 7939	1021	-5.2	20901.0 $
ICP 7867	1129	13.1 *	31845.9 $
ICP 11191	839	-2.3	1793.6 $
ICP 12825	754	-9.0 *	11445.3 $
ICP 12159	796	0.04	-314.1
ICP 12747	1259	-5.2	44777.7 $
ICP 8514	1037	-13.0	54661.0 $
ICP 12749	1288	11.9 ** ++	6507.5 $
ICP 7878	910	-6.7 ** ++	3054.8 $
ICP 14002	1055	12.2	56091.1 $
ICP 8047	928	0.8	8206.6 $
ICP 14269	884	4.5	9480.4 $
ICP 12904	898	12.5 *	27453.1 $
SA 1	1095	1.3	6171.2 $
CD AT 5%	60		

$ significant at 5% level against pooled error
*, ** significant at 5% and 1% level respectively against b=0
+, ++ significant at 5% and 1% level respectively against b=1

as responsive under unfavourable environments. The non- significant bi value indicates the genotype belongs to non- responsive category. Eventhough the genotypes *viz.*, ICP 12749, ICP 12747, ICP 12746 and ICP 7867 recorded significantly high seed yield, they are unstable. While considering S^2d, bi values and mean seed yield together, the genotypes ICP 7991 and ICP 7346 were considered as stable. The genotype ICP 12159, was stable less response over environments but poor yieldr. Thus the present study reveals that the prediction of performance of genotypes over environments would be difficult in late maturing type of pigeonpea. The genotypes namely ICP 7991 and ICP 7346 were found to be stable with higher seed yield. Hence, these genotypes can be suggested for commercial cultivation and can be utilized in further breeding programme.

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INTER-RELATIONSHIP BETWEEN YIELD AND ITS COMPONENT CHARACTERS IN PEARL MILLET

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ABSTRACT

The analysis of inter-relationship among different characters in 76 genotypes of pearl millet (*Pennisetum glaucum* (L.) R. Br.) showed that the grain yield possessed a high and positive association with number of productive tillers, plant height, and 1000 grain weight. The characters, plant height, days to 50% flowering and ear length were mutually correlated. The character pairs, ear length and ear thickness ; and 1000 grain weight and number of productive tillers were positively correlated with each other. The path coefficient analysis revealed that number of productive tillers and plant height had both direct and indirect effects to account for yield. The character thousand grain weight which had positive correlation with yield, showed negative direct effect but had indirect effect through plant height, number of productive tillers, ear length and ear thickness.

KEY WORDS : Pearl millet, correlation, path coefficient

The main objective in any crop improvement programme is to improve yield per unit area and time. Yield is a complex trait and is determined by many of its components. A better picture of the contribution of each component in building up the total genetic architecture of a complex character may be obtained through the correlations. The knowledge of association of the yield components *inter se* and with grain yield is useful for formulating efficient selection criteria for desired improvement. Further, the direct and indirect influence of such component characters on yield